CATALOGUE

OF

MARINE POLYZOA

IN THE

COLLECTION

OF THE

BRITISH MUSEUM.

PART III.

CYCLOSTOMATA.

LONDON:
PRINTED BY ORDER OF THE TRUSTEES.
1875.

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BY

GEORGE BUSK, F.R.S.

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PREFACE.

The Third Part of the 'Catalogue of Marine Polyzoa' has been prepared by Mr. George Busk, F.R.S., the Author of the two preceding Parts, which contain an account of the Chilostomatous Polyzoa.

Although its preparation was commenced many years ago (in fact, soon after the publication of Part 2), its completion was delayed by the difficulty of the subject, by repeated acquisitions of additional specimens, and by the manifold other engagements of the Author. The execution of the Plates (all of which were drawn, and many also lithographed, by the Author himself) was another cause of delay.

There cannot be any doubt that the present Catalogue will be found to contain only a small proportion of existing species; but it is hoped that it will serve as a guide to collectors and students at a time when more attention is paid to these Zoophytes than formerly.

ALBERT GÜNTHER.

British Museum,
Feb. 6, 1875.

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CATALOGUE

OF

CYCLOSTOMATOUS POLYZOA.

INTRODUCTION.

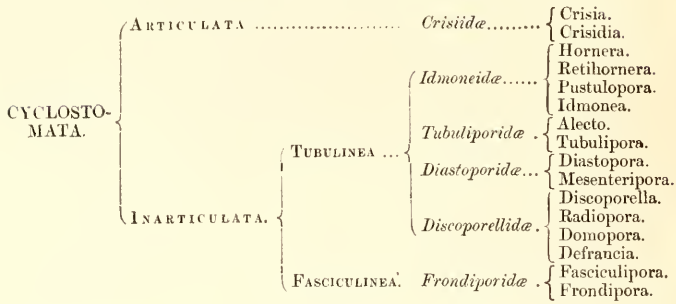
With our present imperfect knowledge of many points in the structure and life-history of the Polyzoa, and the difficulty (more especially in the present Suborder) of arriving at any satisfactory natural arrangement merely from the inspection of the dead skeletons, the classification here adopted can only be regarded as provisional.

Towards a more natural system the labours of Prof. F. A. Smitt have of late years afforded much valuable suggestive matter; and although unprepared to follow Prof. Smitt in many of his conclusions, and disposed to disagree with him in many points as regards the limitation of genera and species, the Author is fully convinced that Prof. Smitt's observations will mark the commencement of a new era in the study of the Polyzoa, and that they will serve, in many cases, to indicate the direction in which our attempts at their natural classification should proceed.

The classification adopted in this Catalogue is nearly the same as that followed in the Author's 'Monograph of the Fossil Polyzoa of the Crag,' 1859, p. 91—a classification which in its main features does not differ very widely from that employed by

Prof. Smitt in his two papers on the order Cyclostomata*. It is shown in the following

Synoptical Arrangement of Recent Polyzoa Cyclostomata.



Suborder II. CYCLOSTOMATA.

Cells tubular, calcareous, partially free or wholly connate; aperture terminal, not furnished with a movable lip or fringe.

Cyclostomata, *Busk*, *Smitt*, *&c.*
Tubuliporina, *M.-Edw.*, *Hagenow*, *Johnston*, *&c.*
Auloporina (pars), *Ehrb.*
Myrioporina (pars), *Ehrb.*
Cerioporina (pars), *Bronn.*
Centrifuginea (pars), *D'Orb.*

I. *C. ARTICULATA* s. *RADICATA.*

Zoarium divided into distinct internodes by flexible joints, attached by radical tubes.

One family only.

Radicellata, *D'Orb.*
Articulatæ *s.* Radicatæ, *Bk. Crag Polyz.* p. 92.

* "Kritisk Förteckning öfver Skandinaviens Hafs-Bryozoer, 1864 & 1865," Öfvers. af Kongl. Vetenskaps-Akademiens Förhandl. 1865, p. 115, & 1866, p. 395.

Family I. CRISIIDÆ, Bk.

Les Crisies, *M.-Edw. Mém. sur les Crisies, les Hornères, &c., Ann. d. Sc. Nat.* 2e sér. t. ix. (1838).
Crisiadæ, *Johnst. B. Zooph.* 2nd ed. p. 282 (1847); *Bk. Voy. of Rattles.* (1852).
Crisidæ, *D'Orb. Pal. Franç. T. Crét.* p. 596 (1850–1852).
Crisiidæ, *Busk, C. Polyz.* 1859, p. 92.
Crisieæ, *Smitt* (1864).

1. CRISIDIA, M.-Edw.

A single cell in each internode.

Sertularia (pars), *Linn., Berkl., Esper.*
Cellularia (pars), *Pallas, &c.*
Cellaria (pars), *Solander, Lamk., Bosc.*
Eucratea (pars), *Lamx., Risso, Fleming, Templeton, Cuvier.*
Unicellaria (pars), *Blainv.*
Crisidia, *M.-Edw., Johnston, Landsb., Gosse, Alder, Hincks, Norman, Busk, &c.* (non *D'Orb., Reuss*).
Crisia (pars), *Johnst.* (1st ed.), *Hassall, Couch, Smitt, Lamx., Thomps.*
Filicrisia, *D'Orb.*
Falcaria, *Oken, Gray.*
Tibiana, *Lister* (non *Blainville, Lamx.*).

1. Crisidia cornuta, M.-Edw. (Plate I. figs. 1–10.)

Each cell giving rise to two secondary cells; oœcia axillary.

Var. *α*. CORNUTA. One of the secondary cells usually aborted and represented by a three-jointed seta.

"Goat's-Horn Coralline," *Ellis, Corall.* p. 42, pl. xxi. fig. C. c (very good).
Sertularia cornuta, *Linn.*; *Esper, Sert.* pl. xix. fig. 1.
Cellularia falcata, *Pallas.*
Cellularia cornuta, *Bruguière, Hogg.*
Cellaria cornuta, *Soland., Lamk., Bosc.*
Eucratea cornuta, *Lamx., Risso, Fleming, Cuvier, Templeton.*
Unicellaria cornuta, *Blainv. Man. d'Actin.* p. 461, pl. lxxvii. figs. 2, 2*a*.
Crisia cornuta, *Johnst.* (1st ed.), *Hassall, Thompson, Couch, Smitt.*
Crisidia cornuta, *M.-Edw. l. c.* p. 11, pl. viii. fig. 2; *Johnst.* 2nd ed. p. 287, pl. 50. figs. 1 & 2; *Landsb.*; *D'Orb. l. c.* p. 603; *Gosse, Alder, Hincks, Norman, &c.*
? Crisidia setacea, *Sars.*

Hab. British and Irish coasts, generally distributed; coast of France (*M.-Edw.*); Mediterranean (*Pallas, D'Orb.*); Sweden and Norway (*Lovén, Sars, Smitt*); Shetland (*Norm.*).

Var. *β*. GENICULATA. (Plate I. figs. 1–4.) Both secondary cells fully developed.

Tibiana (sp.), *Lister, Phil. Trans.* 1834, p. 385, pl. xii. fig. 5.

Crisia geniculata, *M.-Edw. l. c.* p. 5, pl. vi. fig. 1 ; *Johnst.* p. 286 (no fig.) ; *Landsb., Gosse, Sars.*
Crisia cornuta (var.), *Smitt.*
Filicrisia geniculata, *D'Orb. l. c.* p. 604.

Hab. Both shores of the British Channel.

2. CRISIA, Lamx.

Two or more cells in each internode ; oœcia irregularly placed. Synonymy as under *Crisidia*.

Bicrisia (sp.), *D'Orb. l. c.* p. 601.

1. Crisia eburnea, Linn. (Plate II. figs. 1, 2, Plate V. figs. 1, 2, 5–10.)

Zooœcia usually 3–7 in each internode (rarely 9–11), loosely aggregated ; branches usually arising from the lowest zooœcium in the internode ; border of aperture usually circular, sometimes pointed on one side ; oœcium pyriform.

Sertularia eburnea, *Linn., Esper, Jameson.*
"Sertolaria d'avorio," *Cavolini.*
Cellularia eburnea, *Pallas, Bruguière.*
Cellaria eburnea, *Soland., Bosc, Lamarck* ; *Johnst. Trans. Newc. Soc.* ii. p. 262, pl. xi. fig. 5.
Crisia eburnea, *Lamx.* ; *M.-Edw.* ; *Fleming* ; *Johnst. B. Zooph.* ; *Templeton* ; *Blainv.* ; *Risso* ; *Couch* ; *Hincks* ; *Norman* ; *Alder* ; *Hassall* ; *Macgillvray* ; *Hyndman* ; *Reid* ; *Van Beneden, Rech. s. l'Anat. des Bryozoa, Mém. Brux.* t. xviii. p. 28, pl. iii. figs. 12–16 ; *D'Orb., Gosse, &c.*

Hab. British and Irish coasts ; France ; Mediterranean ; Madeira ; Adriatic ; coasts of Norway ; Spitzbergen ; Shetland.

Var. ACULEATA.

Crisia aculeata, *Hass. A. N. Hist.* vi. p. 170, pl. 7. fig. 34, and vii. p. 366 ; *Johnst. l. c.* p. 285 ; *Busk, Rep. B. Ass.* 1859, p. 146.
Crisia eburnea, *M.-Edw. l. c.* p. 198, tab. 6. figs. 2, 2*a*.
Crisia eburnea (var. cornuta), *Smitt, l. c.* p. 117.

The tubular-jointed process described by Dr. Hassall as a "long spinous process" appears to act as a radical tube, serving occasionally as a means of attachment.

2. Crisia denticulata. (Plate II. figs. 3, 4, Plate III. figs. 1–6, Plate IV. figs. 1–4.)

Zooœcia almost straight, connate throughout nearly their whole length ; aperture elliptical, usually pointed on one side ; oœcia often truncate, annulated, placed irregularly ; branches usually arising from the fourth or fifth cell above the joint (occasionally from the second in the lower part of the zoarium).

Cellaria denticulata, *Lamk.*

Crisia luxata, *Fleming*, *Blainville*; *Johnst. B. Z.* 1st ed. p. 262; *Couch.*
Crisia denticulata, *M.-Edw. l. c.* p. 201, pl. vii. fig. 1; *Johnst.* 2nd ed. p. 284, pl. 50. figs. 5, 6; *Gray*; *Sars*; *D'Orb.*; *Gosse*; *Alder*; *Busk*; *Hincks*; *Norman*; *Smitt, l. c.* p. 117 (nec *Floridan Bryozoa*).
Cellaria arctica, *Sars, Nyt Mag.* 1863, p. 31 (teste *Smitt*).

Hab. Coasts of Britain and Ireland, very generally distributed; Norway; ? Spitzbergen; ? Grand Manan (*Stimps.*).

3. Crisia elongata, M.-Edw. (Plate IV. figs. 5, 6.)

Zooœcia 12–21 in each internode, often much produced and curved forwards; aperture orbicular; branches arising from fifth to ninth zooœcium in each internode; oœcium —— ?

Cellaria elongata, *M.-Edw. l. c.* p. 10, pl. 7. fig. 2; *D'Orb. l. c.* p. 599.

Hab. Red Sea? (*M.-Edwards*); Algoa Bay.

4. Crisia edwardsiana, D'Orb. (Plate II. figs. 5–8.)

Zooœcia 2–3 in each internode, curved forwards; dorsal surface of internode convex, and usually ridged transversely; branches arising from the first or lowest cell in the internode; one or other of the zooœcia in each internode usually armed with a long jointed spine; oœcium lateral, pyriform.

? Bicrisia Edwardsiana (*sic*), *D'Orb. l. c.* p. 601 (1852).
Crisidia Edwardsiana (1839), *Voy. dans l'Amér. Mér. Polypiers*, p. 7, pl. 1. figs. 4–8; *M'Gilliv. Aust. Polyzoa*, p. .

Hab. Coasts of Patagonia (*D'Orbigny*); Terra del Fuego (*Darwin* !); New Zealand (*Dr. Sinclair* !); Australia (*M'Gillivray*).

M. d'Orbigny's figure represents the zooœcia as much longer and slenderer than they are in any specimen that has come under my notice; but there can be so little doubt that his is the same species as that here described that I have retained his name.

5. Crisia fistulosa, Heller. (Plate VI.a. figs. 1, 2.)

Zooœcia 6–15 in each internode, closely adnate for the greater part of their length; terminal portion produced, quite cylindrical, slightly contracted towards the end and turned abruptly forwards; branches given off from the third to sixth zooœcium, in the latter case that being the highest in the internode; oœcium subglobose, even, formed by one of the uppermost cells. (Joints white or light brown.)

Crisidia fistulosa, *Heller, Die Bryoz. d. adriatischen Meeres*, p. 118, pl. iii. fig. 5 (not good).

Hab. Adriatic Sea, at Lesina; Lissa; Lagorta (*Heller, Fritsch*).

6. Crisia eburneo-denticulata, Smitt. (Plate VI.)

Cells 9–17 in each internode, cornate throughout, contracted at

the orifice, which is produced into a short cylindrical tube of less diameter than the body of the cell, and projecting forwards nearly at a right angle; branches arising from first to fifth cell; ovicell ventricose, closely adnate.

Crisia eburneo-denticulata, *Smitt, MS.*
Crisia eburnea (var.), *Smitt, l. c.* p. 142 (description of plate), pl. xvi. figs. 9, 10, 11.

Hab. Spitzbergen, 70–96 fathoms.

The general habit and construction of this form is so different from both *C. eburnea* and *C. denticulata* that there can be little doubt of its specific distinction from those species. In the number of cells in each internode it agrees with *C. denticulata*, as also in the close aggregation of the cells; but the peculiar production and contraction of the terminal portion, and the invariably circular simple aperture, suffice, in my opinion, to show its specific distinction; whilst from *C. eburnea* it is distinguished by the number of cells in each internode, the point of origin of the branches, the form of the ovicell, &c. In a very long internode, consisting of 17 cells, a second branch was given off; but usually there appears to be only one. The surface of the cells is very finely sulcate longitudinally.

7. **Crisia acropora**, Bk. (Plate V. figs. 3, 4.)

Cells 9–13 in each internode; a conical tooth (sometimes bifid) behind the aperture; cells slightly compressed; surface closely punctured, brilliant, sometimes porcellaneous; branches arising from second to fourth cell. Ovicell ——?

The radical tubes are much curled; and they always arise from the bottom of the lowest cell in the internode, behind.

Crisia acropora, *Bk. Voy. of Rattles.* vol. i. p. 351.

Hab. Bass Strait, 47 fathoms.

8. **Crisia margaritacea**, n. sp. (Plate VI. B. fig. 1.)

Cells 13–21 in each internode, connate throughout, contracted towards the aperture, which is produced into a short cylindrical tube curved abruptly forwards; occasionally a small tooth behind the aperture; branches arising from fourth to eighth cell, usually from fifth.

Crisia denticulata, *Bk. Voy. of Rattles.* vol. i. p. 351.

Hab. Australia (*'Rattlesnake,' Voy. of 'Fly,' Jukes*).

9. **Crisia sinclarensis**, n. sp. (Plate IV. figs. 7–11.)

Cells 7–9 in each internode, connate throughout; aperture orbicular, with a strong denticle behind it; surface sparsely and irregularly punctured; branches arising usually from the second, occasionally from the first cell.

Hab. Coast of Patagonia (*Dr. Sinclair*).

One peculiarity of the species appears to be the frequency with which the continuation of the axis or the terminal internode of a branch is aborted and assumes the form of a hollow conical process (*vide* fig. 11). The same thing, however, may occasionally be noticed in other species.

10. **Crisia holdsworthii,** sp. n. (Plate VI. B. fig. 2.)

Cells 9–11 in each internode, connate throughout, with a short, tubular, cylindrical prolongation which projects directly forwards; walls very delicate, sparsely punctured; branches arising usually from the third, sometimes towards the base of the zoarium, from the second cell. Ovicell ——?

Hab. Pearl-oyster Bank, Ceylon (*Holdsworth*).

Growth very slender and delicate.

11. **Crisia conferta,** sp. n. (Plate VI. A. fig. 5.)

Cells 13–21 in each internode, nearly the upper half free, cylindrical, curved forwards; aperture orbicular or subelliptical, of same diameter as the tube; branches one to four from each internode, not opposite; ovicell closely adnate, median or axillary, (usually) truncate.

Hab. Cape-Verd Islands (*H.M.S.* '*Herald*').

A very distinct and well-marked species. It grows in dense tufts; and the numerous branches arising from each internode are very characteristic. That the curved free portion of the cell is not, as is frequently the case, a mere production of the peristome, is proved by its walls presenting the same puncturation as is seen on the rest of the cell.

12. **Crisia tubulosa,** n. sp. (Plate VI. A. figs. 3, 4.)

Zoarium forming dense tufts; usually two opposite branches from each internode; 7–9 cells in each internode, long, much produced, ascending slightly, curved forwards; mouth expanded, orbicular; oœcium pyriform, closely adnate, usually placed between the branches. Joints white or light-coloured.

Hab. Cape-Verd Islands (*H.M.S.* '*Herald*').

The rather close tufted growth of this species may at first sight lead to its being confounded with the preceding; they are, however, perfectly distinct.

Other recent forms noticed by Authors.

13. **Crisia sertularioides,** D'Orb. 1851.

Proboscina sertularioides, *Aud.* 1826; *Savign. Egypt.* pl. 6. fig. 6.

Hab. Red Sea?

May be *C. fistulosa*, Heller.

14. Crisia patagonica, D'Orb.

"Cells from 9–19, straight, very distinct; branches arising from second or third cell; sometimes two from an internode, when the second arises from the sixth cell. Joints black."

Crisia patagonica, *D'Orb. Voy. Amér. Mérid. Polypiers*, p. 7, pl. 1. figs. 1–3.

Hab. Patagonia.

15. Crisia sinensis, D'Orb.

"Allied to *C. denticulata*, but with longer and more regular segments, and the cells far more closely aggregated and more numerous."

Crisia sinensis, *D'Orb. Pal. Franç.* p. 599.
? Crisia elongata, *M.-Edw.*

Hab. Hongting.

16. Crisia martinicensis, D'Orb.

"Branches very straight, slender, elongated; cells widely remote."

Crisia martinicensis, *D'Orb. Pal. Franç.* p. 599.

Hab. Martinique.

17. Crisia californica, D'Orb.

"Allied to *C. dentata* [*sic*], but with the segments much longer, thicker, and wider, the cells closely aggregated and slightly prominent. Ovicell smooth, placed on the side of a segment."

Crisia californica, *D'Orb. Pal. Franç.* p. 599 (1852).
? Crisia denticulata.

Hab. Lower California.

18. Crisia punctata, D'Orb.

"Segments irregular, remarkable for the great prominence of the cells and their punctation."

Crisia punctata, *D'Orb. l. c.* p. 600.
? = Crisia sinclarensis.

Hab. Ile de Venado, Mer Vermeille, California.

19. Crisia attenuata, Heller.

"Branches slender, thin, smooth; cells long, cylindrical, straight, connate throughout, alternate; aperture round, scarcely projecting, looking outwards; internodes attenuated at the base

the upper end, composed of 8–10 pairs of cells (16–20). Surface dull white, slightly punctured."

Crisia attenuata, *Heller, l. c.* p. 117, pl. iv. figs. 1, 2.

Hab. Adriatic (Lesina).

20. **Crisia recurva**, Heller.

"Delicate, much branched; branches slender, covered with numerous white points; cells cylindrical, alternate, in the first two thirds straight and closely connate, in the last third free and curved outwards at almost a right angle; aperture round; internode usually formed of four pairs of cells. Ovicells rather large, subglobular, [axillary,] with white punctures."

Crisia recurva, *Heller, l. c.* p. 118, pl. iv. figs. 3, 4.

Hab. Adriatic (Lesina).

21. **Crisia setosa**, M'Gilliv.

"Cells 6–10 in an internode, closely adnate, upper extremity usually free for a very small extent; mouth circular, entire; cell prolonged outside the mouth into a stout projection, to which is articulated a long, hollow, calcareous spine; surface finely and minutely granular; branches usually given off between the first and second pair of cells. Joints brown."

Crisia setosa, *M'Gilliv. Australian Polyzoa*, p. 16.

Hab. Australia.

22. **Crisia biciliata**, M'Gilliv.

Cells two in an internode; outer extremity free for a short distance; mouth circular; from the outside of each cell arise two long, hollow, jointed, filiform processes. Surface granular. Joints light brown or white.

Crisia biciliata, *M'Gilliv. l. c.* p. 16.

Differs, according to Mr. M'Gillivray, "from *Crisidia edwardsiana*, D'Orb." (which, as he states, occurs in Australia), "in the presence of two long jointed cilia on each cell, there being but one in *C. edwardsiana* . . . . in which species also," he remarks, "the cells are much more produced and the cilia are situated much further down the back of the cells." The joints, moreover, in *C. edwardsiana* are black.

23. **Crisia producta**, Smitt.

Zoœcia 1–4 in each internode, disposed very irregularly, free for more than half their length; free portion very much produced, slightly curved outwards and forwards, cylindrical; aperture orbi-

cular. Branches arising very irregularly from one or more zooœcia in each internode. Ovicell deeply immersed (a mere expansion of one of the zooœcia).

Crisia producta, *Smitt, Scandiv. Hafs-Bryoz.* p. 116, pl. xvi. figs. 4, 5, 6.
Crisia eburnea (var.), *Norman, Report on Shetland Dedging*, p. 309.

Hab. Coast of Norway (*Smitt*); Shetland (*Norm.*).

Probably only a variety of *Crisidia cornuta* (*vide* Plate I. fig. 3). It does not appear to have any character in common with *C. eburnea*.

II. *INARTICULATA.*

Zoarium continuous throughout, not divided into distinct internodes; fixed immovably by a contracted calcareous base and erect, or immediately adnate upon foreign bodies and recumbent in whole or in part.

Centrifuginés empâtés à cellules non operculées, *D'Orb. Pal. Franç.* p. 605 (pars).
Inarticulatæ s. adfixæ, *Busk, Monog. Crag Polyz.* p. 93.
Incrustata, *D'Orb.*; *Smitt, l. c.* p. 395.

A. *ERECTÆ.*

Family II. IDMONEIDÆ, Bk.

Zoarium usually erect, simple or branched; branches cylindrical, subcylindrical, or triangular, free or anastomosing.

Tubigeridæ (pars), *D'Orb. l. c.* p. 698.
Tubuliporidæ (pars), *Johnst., Smitt.*
Les Tubuliporiens (pars), *Milne-Edw. l. c.* p. 14.
Idmoneidæ, *Bk. Crag Polyz.* p. 94.
Idmoneadæ, *Bk. Eng. Cyclopædia*, art. "Polyzoa."

1. **IDMONEA**, Lamx.

Zoarium ramose; branches dichotomous or irregular, free or anastomosing; orifices of cells disposed in parallel or subparallel, transverse or oblique, usually alternate rows on each side of the front of the branches, which are usually triangular and flattened behind.

Idmonea, *Lamx. Exp. Méth.* p. 80; *Defrance*; *Blainville*; *M.-Edwards*; *Johnston*; *Lonsdale*; *Reuss*; *Michelin*; *Hagenow*; *D'Orb.* 1852 (pars); *Römer* (pars); *Smitt* (pars); *Busk, l. c.* p. 104; *V. Beneden.*

Crisia (pars), *D'Orbigny*, *Stoliczka*, *Smitt*.
Retepora (pars), *Goldfuss*, *Lamk*.
Diastopora (pars), *Michelin*.
Tubulipora (pars), *Lamk*.
Tubulipora, subgen. Idmonea, *Smitt*, *l. c.* p. 398.

a. *Branches subtriangular or angular in front.*

1. **Idmonea atlantica**, E. Forbes. (Plate IX.)

Zoarium irregularly branched, usually more or less in one plane; branches triangular; cells 1–4 or 5 in each series, the innermost the longest; dorsal surface of branch not perforate; peristome entire.

Idmonea radians, *V. Beneden*, *l. c.* p. 646, pl. xii. figs. 4, 6.
? Idmonea coronopus, *Defr. Dict. d. Sc. Nat.* xxii. p. 565; *D'Orb.*; *M.-Edwards*, *l. c.* pl. 8. fig. 4.
Idmonea atlantica, *Smitt*; *Johnston*, *l.* c. p. 278, pl. 48. fig. 3 (bad); *Gray*, *Cat. Rad.* p. 141; *Sars*, *Reise Lof. Finm.* p. 145; *Landsb.*; *Gosse*, *Mar. Zool.* part 2, p. 8. fig. 3; *Busk*, *Ann. Nat. Hist.* ser. 2, vol. xviii. p. 34, pl. 1. fig. 6, *a–e*; *id. Quart. J. Micr. Science*, vi. p. 128, pl. xviii. fig. 5; *id. Rep. Brit. Assoc.* 1859, *Trans. Sect.* p. 146 (var. *tenuis*); *Smitt*, *Floridan Bryozoa*, p. 6, pl. ii. fig. 7.
? Idmonea angustata, *D'Orb. Pal. Franç.* p. 731.

Hab. Arctic seas and coasts of Norway and Finmark; Shetland (*Barlee*). Var. *tenuis*. North Atlantic; Gulf of Florida; Madeira.

2. **Idmonea radians**, Lamk. (Plate VII. figs. 1–4.)

Zoarium usually procumbent, stipitate, sometimes suberect; branches dichotomous, radiating more or less regularly in a circular form from the centre, very angular in front; dorsal surface perforated; cells 1–4 in each series, the innermost the longest; aperture (when quite perfect) bilabiate.

Retepora radians, *Lamk. Hist. d. An. s. Vert.* 2nd ed. p. 279; *D'Orbigny*, *l. c.* p. 731.
? Hornera radiata, *Blainville*, *Man. d'Actin.* p. 419.
Idmonée rayonnante, *M.-Edw. l. c.* p. 25.

Hab. Australian seas (abundant); New Zealand.

There can be no doubt of the distinctness of *I. radians* from the northern form, *I. atlantica*, nor of its occurrence in the seas of New Holland, of which M. M.-Edwards appears to have had some doubt.

Its peculiar and very beautiful, regular habit, when in perfection, delicacy of structure, size, and, above all, its punctured dorsal surface, at once suffice to distinguish it. In all the instances I have seen, in this species more especially, the zoarium arises from a short upright stem, which spreads out at bottom into a small circular disk of attachment upon shells and stones. *Idmonea atlantica* is less regular in form, but sometimes affects a stelliform procumbent figure; and, although the growth of the tubular cells is confused at the bottom, I have never myself seen it to arise from what could properly be termed an adnate growth like *Crisepia* or *Tubulipora*.

Prof. Smitt's experience, however, would appear to lead to the belief that it sometimes does so; and that able observer has thence been induced to place *Idmonea* in the same family, in fact as a subgenus of *Tubulipora*. At present, from my own observation, I am unable to agree with him on this point.

3. **Idmonea milneana**, D'Orb. (Plate XI.)

Zoarium spreading, ramose, dichotomous, each longer branch usually terminating in a pair of short forks; tubes very slightly exserted, flattened, and even; aperture wide, margin thick; four cells in each series. Surface finely dotted, slightly sulcate behind; dorsal surface convex, usually marked with concentric lines of growth.

Idmonea milneana, *D'Orbigny, Voy. Amér. Mérid., Polypiers*, p. 20, pl. ix. figs. 17–21; *Pal. Franç.* p. 732; *Smitt, Floridan Bryozoa*, pl. iii. figs. 14, 19.

? Idmonea transversa, *M.-Edw. l. c.* p. 26, pl. ix. fig. 3.

Hab. Iles Malouines (*D'Orb.*); coast of Tierra del Fuego and Patagonia, 30 fathoms; Chonos archipelago (*Darwin*).

M. M.-Edwards's figure of *I. transversa* appears to represent *I. milneana*.

4. **Idmonea contorta**, n. sp. (Plate VIII.)

Zoarium irregularly branched or lobate; branches, or lobes, nearly uniform in size, variously contorted, sometimes inosculating; cells usually connate and immersed throughout, sometimes much produced and projecting, 5–7 in each series. Surface finely punctured; dorsal surface convex, marked with concentric lines of growth.

Hab. Algoa Bay, South Africa.

5. **Idmonea notomala**, n. sp. (Plate XII. A.)

Zoarium dichotomously branched; branches flattened or concave behind, rounded in front; cells deeply immersed, 3–5 in each series (usually 4); the series on either side are separated by a wide interspace, in which there are no openings of cells.

Hab. Rasel Amoush, Mediterranean (*H.M.S. 'Porcupine'*).

As the specimens upon which I have ventured to found this species, brought home by the 'Porcupine' Expedition, consist of only four or five small worn fragments of evidently an old dead growth, the above characters will apply only to the advanced stage of development. They are, however, sufficient to distinguish the form to which they belong from any other with which I am acquainted. That it has no relation with *I. atlantica* is at once obvious; nor does it agree with any of the forms described by Heller or Meneghini under the names of *I. frondosa, gracilis, serpula, meneghinii, triforis, tubulipora*, and *irregularis*. There only remains, therefore, *I.*

transversa of Milne-Edwards; but as there is every reason to believe that what M. Milne-Edwards has described and figured under that name is really *I. milneana*, D'Orb., and as his figure, at any rate, will in no way suit the present form, it is impossible to place them together, even were it right in any case to adopt Lamarck's specific appellation, which was clearly applied by him, not to any form of *Idmonea*, but to a parasitic *Tubulipora*, probably *T. serpens*.

6. **Idmonea marionensis**, n. sp. (Plate XIII. figs. 3–5, Plate VII. figs. 7, 8, young state.)

Zoarium slender, elongated, very sparingly branched; stem and branches cylindrical; cells 2–3 in a series (more usually 2), series wide apart. Surface very finely and sparsely punctured; dorsal surface convex, with a fine longitudinal striation.

? Crisina hochstetteriana, *Stoliczka, Novara Exp. Geol. Th.* Bd. i. p. 113, tab. xviii. fig. 3; *Smitt, Floridan Bryozoa*, p. 6, pl. ii. figs. 11–13.

Hab. Marion Island, 80 fathoms (*Voy. Erebus & Terror*,); ? Gulf of Florida, Bahia (*Smitt*, fossil); Orakei Bay, Auckland, New Zealand (*Stoliczka*).

This species marks a transition between *Pustulopora* and *Idmonea*. The cells, however, are always placed in rows or series on each side of the anterior aspect of the branch and deeply immersed. It may possibly be identical with M. d'Orbigny's *I. canariensis* (Pal. Franç. p. 732); but as no figure or description of that species is given, and it is merely stated to be "slender as a thread and almost round, with very few cells," it is impossible to be certain.

7. **Idmonea irregularis**, Meneghini. (Plate XII.)

Zoarium branched dichotomously; branches slender, rounded; cells 4–6 in each series, the outermost of which are the longest. On the front of the branch, between the lateral series, the surface presents the openings of scattered cells.

Idmonea irregularis, *Meneghini, Mem. sui Polypi della Famiglia dei Tubuliporiani*, p. 12 (teste *Heller*); *Heller, l. c.* p. 121.

Hab. Adriatic, on the Dalmatian coast (*Menegh., Heller*); Mediterranean (*H.M.S. 'Porcupine'*).

Like *I. marionensis*, which has some of the characters of a *Pustulopora*, the present form may be regarded as passing into *Hornera*.

8. **Idmonea parasitica**, n. sp. (Plate X. figs. 2, 3.)

Zoarium irregularly branched; branches slender, straggling, often anastomosing; cells slender, in great part free, and curved in various directions, 2–5 in each series; surface smooth, dotted.

Hab. South Australia, parasitic upon *Pustulopora intricaria* (Gould).

9. Idmonea gracillima, n. sp. (Plate VII. figs. 5, 6.)

Zoarium dichotomous; branches long and very slender; cells usually in pairs on each side of the front of the branch, with intermediate ones in front, the outer tubes the longest; oœcium pyriform, prominent (like that of *Crisia*); surface smooth, dotted.

Hab. Atlantic Ocean, 286–322 fathoms (*H.M.S.* '*Porcupine*').

Something like *I. irregularis* in the disposition of the cells, but much slenderer and more delicate. As the oœcium of *I. irregularis* is unknown, no conclusion can be drawn from its peculiar character in *I. gracillima*, in which, unlike all other *Idmoneæ*, it is a distinct pyriform vesicle, like that of a *Crisia*.

Other recent species noticed by Authors.

10. Idmonea frondosa, Meneghini.

Dichotomously branched. Branches strongly divergent, rather broad, tapering towards the end; cells 6 in each series, long and delicate, connate only at the base.

Idmonea frondosa, *Meneghini, l. c.* p. 12; *Heller, l. c.* p. 120.

Hab. Adriatic Sea.

11. Idmonea gracilis, Meneghini.

"Branches all directed to one side; cells 5 in each series, the central ones the longest."

Idmonea gracilis, *Meneghini, l. c.* p. 12; *Heller, l. c.* p. 120.

Hab. Adriatic Sea.

12. Idmonea serpula, Heller.

"Dichotomously branched; branches strongly divergent, rather wide, lateral series closely approximated, alternate, each constituted of 5–6 cells diminishing in length from the inner end of the series; the two or three inner cells connate, the two or three outer usually free and curved outwards."

Idmonea serpula, *Heller, l. c.* p. 120, pl. iii. figs. 8, 9.
? Idmonea frondosa, *Menegh.*

Hab. Adriatic Sea.
This is very probably identical with *I. frondosa*, Menegh.

13. Idmonea meneghinii, Heller.

"Dichotomously branched; branches moderately divergent, slender, subtriangular, lateral series approximated and oblique, alternate,

constituted of five cells diminishing in length from within outwards, pretty closely connate. Surface spotted with white."

Idmonea meneghinii, *Hell. l. c.* p. 120, pl. iii. figs. 6, 7.

Hab. Adriatic Sea.

14. **Idmonea triforis**, Heller.

"In habit like the preceding, only that the branches are more attenuated, and there are only three cells in each series."

Idmonea triforis, *Hell. l. c.* p. 120.

Hab. Adriatic.

15. **Idmonea tubulipora**, Meneghini.

"Zoarium expanded horizontally, the numerous branches radiating from a central point; lateral series regularly alternate, oblique, not simple as in other species, but consisting of two or three rows of cells, which are closely connate."

Idmonea tubulipora, *Menegh. l. c.* p. 12; *Heller, l. c.* p. 120.

16. **Idmonea dilatata**, D'Orb.

"Rose-coloured when fresh; branches short and very wide, smooth or longitudinally striated beneath; the series of cells form, as it were, projecting horns on both sides, each contains six cells produced into long salient tubes."

Idmonea dilatata, *D'Orb. Pal. Franç.* p. 731.

Hab. Ile de Ré.

17. **Idmonea angustata**, D'Orb.

"Branches only half as wide as in the preceding, and much thicker, compressed, the lateral series composed of three very long free cells, which are wide apart."

Idmonea angustata, *D'Orb. l. c.* p. 731.

Hab. Banks of Newfoundland.

18. **Idmonea rustica**, D'Orb.

"Irregularly branched; branches as much compressed as in *I. dilatata*; the series of cells much more closely approximated and indistinct in the middle of the branches, each composed of 4–5 cells; dorsal surface wrinkled, transversely punctate."

Idmonea rustica, *D'Orb. Pal. Franç.* p. 731.

Hab. Manilla, Hongkong, Macao, Chusan archipelago (*D'Orb.*).

19. Idmonea tuberosa, D'Orb.

"Slender, everywhere wrinkled transversely, branched, slightly compressed; rows indistinct, each consisting of two separate cells."

Idmonea tuberosa, *D'Orb. l. c.* p. 731.
? Idmonea marionensis, *Bk.*

Hab. Ile de Basilan.

20. Idmonea canariensis, D'Orb.

"Slender as a thread, almost round, with very few cells."

Idmonea canariensis, *D'Orb. l. c.* p. 731.
? Idmonea gracillima. *Bk.*

Hab. Teneriffe (*D'Orb.*).

21. Idmonea californica, D'Orb.

"Wide, much depressed, marked as if by steps of growth beneath, presenting above simple transverse lines of cells not interrupted in the middle."

Idmonea californica, *D'Orb. l. c.* p. 731.

Hab. Ile de Venado, Mer Vermeille, California (*D'Orb.*).

22. Idmonea fenestrata, Busk.

Zoarium irregularly reticulate; branches anastomosing, subtrigonal, often angular behind; mouths of cells projecting, quadrangular, 5–6 in each series; cells flattened in front. Surface finely punctate; dorsal surface very finely reticulate, sulcate, with elongated pores in the sulci.

Idmonea fenestrata, *Bk. Mon. Crag Polyzoa*, p. 105, pl. xv. fig. 6?; *Smitt, Skandin. Hafs-Bryozoer*, 1866, p. 339.

Hab. Spitzbergen, 50 fathoms (*Malmgren*). Fossil in the Coralline Crag.

The identification of this species with the Crag form has been made by Prof. Smitt with some doubt.

2. HORNERA, Lamx.

Zoarium ramose, ramification irregularly dichotomous. Branches cylindrical or subcompressed. Zooœcia opening only on one side of the branch. Oocœcia dorsal or anterior.

Hornera, *Lamx. Exposit.* p. 41 (1821); *Milne-Edwards* (pars); *Reuss* (pars); *Blainville* (pars); *Defrance, Michelin, Hagenow, D'Orbigny, Smitt, Busk, Sars, Alder, Norman, &c.*
Millepora (pars), *Linn., Pallas, Esper, Solander.*
Retepora (pars), *Lamk., Goldfuss.*
Siphodictyum, *Lonsdale.*

a. *Species with dorsal oœcia; anterior surface longitudinally fibrillated or sulcate.*

1. **Hornera frondiculata,** Lamx. (Plate XX. figs. 1, 2, 3, 6.)

Branches tapering, more or less in one plane, cylindrical or subcompressed; anterior surface strongly fibro-reticulate, presenting rhomboidal spaces in which are situated the openings of the zooœcia surrounded by numerous pores; mouth of tubes exserted, usually bifid; dorsal surface coarsely reticulate, granular or nearly smooth, with small elongated pores in the sulci; oœcium oblong, carinate, ribbed; aperture tubular, superior.

Hornera frondiculata, *Lamx. Exposit.* p. 41, pl. 74. figs. 7–9; *M.-Edw. l. c.* p. 17, pl. 9. figs. 1-1 *c*; *Blainv. Man. d'Actinol.* p. 419; *Heller, l. c.* p. 124.
Retepora frondiculata, *Lamk.*
? Millepora tubipora, *Ell. & Sol.* p. 139, pl. xxxi. fig. 1.
Millepora lichenoides, *Linn., Pallas, Esper.*
? Hornera affinis, *M.-Edw. l. c.* p. 9, pl. x. fig. 1.
? Hornera andegavensis, *Michelin, Icon. Zoophyt.* p. 318, pl. 76. fig. 8.
Hornera serrata *et* tubulosa?, *Meneghini, l. c.* p. 10.

Hab. Mediterranean, Adriatic (very abundant). Fossil in the Crag and Upper Tertiaries of Sicily &c.

2. **Hornera lichenoides,** Linn. (sp.). (Plate XVIII. figs. 5, 6.)

Zoarium irregularly dichotomous; branches crowded; anterior surface faintly fibro-reticulate, sparsely punctate; opening of zooœcia in front of branches circular, and either wholly immersed or slightly prominent, those on the sides of the branches tubular; orifice elliptical, entire, the border being produced on one side; dorsal surface finely sulcate, with minute pores in the sulci; oœcia dorsal, subglobular; surface reticulate or coarsely punctured; aperture tubular, lateral. (*Alder.*)

"Corallium," *Pontoppidan, Norges Naturrl. Hist.* i. p. 258, pl. 14. figs. D, E.
Millepora lichenoides, *Linn.*; *Müller, Prodrom.* p. 252. no. 3046; *Ström, Act. Hafn.* xii. p. 309, pl. iii. fig. 12; *Fabricius, Zool. Samml.* (*MS. Smitt*), et *Faun. Grœnl.* p. 432 (non *Pallas*).
Hornera frondiculata, *Sars, Reise Loff. Finm., Nyt Magazin f. Nat. Vid.* t. vi. p. 146; *Busk, Ann. N. H.* 2 ser. xviii. p. 34, pl. i. fig. 7.
Hornera borealis, *Busk, Crag Polyzoa,* pp. 95 & 103; *Alder, New Brit. Polyzoa, Mic. Journ.* new ser. vol. iv. p. 108, pl. v. figs. 1, 6.
Hornera lichenoides, *Smitt, l. c.* p. 404, pl. vi. fig. 10, pl. vii. figs. 1–14.

Hab. Arctic Seas (*Lovén*); coast of Norway (*Pontopp., Sars, M'Andrew*); Shetland (*Barlee*).

3. **Hornera cæspitosa,** n. sp. (Plate XV.)

Zoarium densely and irregularly branched in all directions; secondary branches short and truncate; anterior surface obscurely

fibrillated, granular, punctured; mouths of zooœcia circular, level with the surface, arranged in irregular quincunx; peristome entire, slightly thickened; dorsal surface granular, irregularly sulcate, densely punctured with unequal round pores; oocœcium unknown.

Hab. Cape Capricorn, 15 fathoms (*Voy. Rattlesnake*); Tierra del Fuego, 53° S., 30 fathoms (*C. Darwin*).

The Australian form is rather more robust than the Fuegian; but in essential characters the two appear to coincide.

4. **Hornera pectinata**, Busk.

Zoarium irregularly branched; branches terete; anterior surface sparsely punctured and obscurely ridged, porcellaneous, dorsal sparsely punctured; mouths of zooœcia exserted; peristome pectinate; oocœcia unknown.

Hornera pectinata, *Bk. Quart. Journ. Mic. Sci.* new ser. vol. i. p. 79, pl. xxxiii. figs. 4–6.

Hab. Madeira (*J. Y. Johnson*).

b. *Species with the oocœcia anterior, either wholly or in part; surface in front not fibrillated or sulcate.*

5. **Hornera violacea**, Sars. (Plate XVIII. figs. 1–4.)

Zoarium irregularly branched; branches short, truncate; zooœcia distinct, immersed or in part free; dorsal surface granular or very finely striated with minute pores; ovicells elongated, situated in the axils of the branches, partly in front and partly behind, smooth and finely punctate, with a thin median costa.

Hornera violacea (*forma* violacea), *Smitt, l. c.* p. 404, tab. vi. figs. 6–9; *Sars, Geol. og Zool. Jagtt. Reise Trondj.* 1862, *Nyt Mag. Nat. Vid.* xii. p. 282.

Pustulopora oreadensis, *Bk. Q. J. Mic. Sc.* (1860), viii. p. 214, pl. 39. figs. 1, 2.

Hab. Arctic Seas; coast of Norway, Hammerfest (*Sars*).

Var. *a.* PROBOSCINA. (Plate XVIII. figs. 1, 3.) Oocœcia in front, suborbicular, umbilicate, finely punctate.

Hornera violacea (*forma* proboscina), *Smitt, l. c.* p. 404, pl. vi. figs. 2 & 5.

Zoarium irregularly branched; branches lax and straggling; zooœcia tubular, distinct, elongated, in great part free; anterior surface without sulci, ridges, or punctures; dorsal surface granular, finely punctate; oocœcia anterior, suborbicular or elongate, situated in the axils of the branches, partly in front and partly behind (*Norman*); smooth, finely punctate, with a thin median costa.

Var. β. TUBULOSA. (Plate XVIII. figs. 2, 4.) Oœcia represented by an elongated dilatation in front of a branch; surface smooth.

With respect to the last-mentioned form, I have considerable doubt as to the propriety of associating it with *H. violacea* at all. It forms, in fact, so marked a transitional form between *Pustulopora* and *Hornera* that it might as reasonably be given to one as to the other. The specimen from which I have made the figures and taken the description was given to me many years since by my friend Mr. Bowerbank, who informed me that it was procured by Captain Beaufort in the North Atlantic in lat. 21° 35′ N. and 90° 42′ W., at a depth of 20 fathoms.

It differs from *H. violacea* not only in its colour, which is brown, but more importantly in the constitution of the oœcium, which in no respect resembles that of the other species of *Hornera* with which we are acquainted, but is exactly like that of *Pustulopora*, *Idmonea*, &c.; *i. e.* it is formed by a simple expansion of variable size in front of a portion of a branch (Plate XVIII. fig. 2). Should it be regarded as a species distinct from *H. violacea* (var. *proboscina*), it might be thus diagnosed:—

Hornera tubulosa.

Zoarium brown, irregularly dichotomous; branches occasionally inosculating; zoœcia tubular, free for about half their length, curved forwards and very long; mouth orbicular, border even, somewhat expanded; surface finely dotted, smooth, dorsal surface very finely punctate; oœcia formed by an elongated enlargement on the front of a branch.

3. **RETIHORNERA**, Kirchenpaur.

Zoarium foliaceous, composed of subparallel branches connected by transverse tubules, so as to form an expanded frond with quadrangular fenestræ.

Retihornera (pars), *Kirchenpaur, Catalogue* iv. *of the Museum Godeffroy, Hamburg*, May 1869.
Hornera ——, *M'Gillivray, Austr. Polyzoa.*

1. **Retihornera foliacea**, M'Gillivray. (Plate XIII. figs. 1, 2; Plate XIX.)

Zoarium irregularly plicate or convoluted, rising from a short central stem with a discoid base; branches very closely approximate; the oblong fenestræ consequently are usually narrower than the branches; mouths of zoœcia exserted, margin toothed; anterior surface granular, numerous delicate spines projecting into the fenestræ; dorsal surface granular, irregularly sulcate, or sometimes nearly smooth; oœcia unknown.

Hornera foliacea, *Macgillivray.*
? Retihornera dentata, *Kirchenpaur.*
? Retihornera plicata, *id.*

Hab. South Australia (*Gould*, *M'Gillivray*).

Several different forms of fenestrate *Horneræ* occur in the fossil state in Australia, probably of Miocene age; and it would seem not improbable that there may be more than one still living in those seas; for I am by no means certain that the form to which I have applied Mr. M'Gillivray's appellation may not be distinct from that intended by him. From the description given by Mr. M'Gillivray it seems, however, that the main difference between the form described by him and a species with which I have been abundantly furnished by Mr. Gould is in the size of the fenestræ, and the absence of the peculiar delicate spines with which the sides of the fenestræ, in the perfect condition, are furnished. These delicate processes are so readily broken off, and in fact so frequently absent, that the character they afford may be readily overlooked (Plate XIII. figs. 1, 2). It is also not improbable that the size of the fenestræ may vary considerably; so that it is perhaps better to await further evidence before setting up a new species upon such variable features.

Herr Kirchenpaur's genus *Retihornera* would, from his descriptions, appear to include some Escharidan or Cheilostomatous forms approaching *Retepora*; but amongst them his *R. dentata* and *plicata* appear without doubt to be Cyclostomatous; and I have therefore ventured to appropriate his expressive appellation for the fenestrate forms of *Hornera*, not regarding it, however, as impossible that the fossil genus *Fenestella* may have a prior claim after all.

4. PUSTULOPORA, Blainville.

Zoarium simple or branched; branches cylindrical, clavate, or terete, composed of tubular cells which open on all sides.

Pustulopora (pars), *Blainv. Man. d'Act.* p. 418 (1834); *M.-Edw. l. c.* p. 27; *Hagenow, Maast. Kreideb.* (nec *Geinitz*); *Reuss*; *Michelin*; *Lamk. An. s. Vert.* ii. p. 314; *Rœmer*; *Heller*; *Grube*; *Meneghini*; *Busk.*
Pustulipora, *Blainv. l. c.* p. 691 (index); *Johnston*, 2nd ed. p. 278; *E. Forbes?*; *Gray, List B. Rad.* p. 143.
Tubulipora (pars), *Couch.*
Entalophora (pars), *Lamx.* (1821), *D'Orbigny.*
? Ceriopora (pars), *Goldf.*, *Hagenow*, *&c.*

1. Pustulopora delicatula, n. sp.

Zoarium about half an inch high, usually branched twice dichotomously; cells very long, rather more than half connate, rest free, gently curved; oœcium tumid.

Hab. Australia, Cape Capricorn, 15 fathoms (*Voy. Rattlesnake*); ? Madeira (*J. V. J.*).

The small size, delicate structure, and the absence of brown spots amply suffice to distinguish this species from *Pustulopora australis*. But it is not so easy to define the characters by which it is distinguished from *P. proboscidea* or *P. deflexa*. The chief are its peculiar mode of growth in a minute polyzoarium composed usually of a stem dividing into two branches, each of which again divides into two short ramules; and it never seems to go beyond this stage of growth.

2. **Pustulopora australis,** Busk. (Plate XVII. A. left figure.)

Zoarium branched dichotomously; branches short, incrassated, truncate; cells almost entirely immersed or about half free; surface minutely papillose, summits of papillæ of a dark brown or black colour. With age the walls become much thickened and porcellaneous, with transverse rugæ.

Pustulopora australis, *Bk. Voy. Rattles.* i. p. 350.

Hab. Bass's Strait, 45 fathoms, and elsewhere in the Australian seas.

3. **Pustulopora parasitica,** n. sp. (Plate XVII. figs. 1, 2.)

Zoarium about a quarter inch high, usually formed of 1–3 branches, short and truncate; cells usually deeply immersed, and very slightly prominent, except in very young specimens. Colour brown, with white spots.

Hab. Bass's Strait, 45 fathoms; New Zealand. Always parasitic upon a species of *Catenicella*.

4. **Pustulopora proboscidea,** E. Forbes. (Plate XVII. A. right figure.)

"Zoarium slender, branched alternately; cells slightly projecting, four completing a whorl."

Pustulipora proboscidea, *Johnst.* 2nd ed. p. 278, pl. 48. figs. 4–4; *Gray, List B. Rad.* p.

Entalophora proboscidea, *D'Orb. Pal. Franç.* p. 780.

Pustulopora proboscidea, *M.-Edw. l. c.* p. 27, pl. 12. fig. 2; *Heller, l. c.* p. 125; *Grube, Die Insel Lussin,* p. 68.

Hab. Shetland seas (*E. Forbes*); Mediterranean (*M.-Edw.*); Adriatic (*Heller &c.*); Teneriffe and Canaries (*D'Orb.*); Madeira (*J. Y. J.*).

The occurrence of this species is not noticed either by Mr. Norman among the Shetland forms, nor does any species of *Pustulopora* appear in Professor Smitt's lists of Scandinavian or Arctic Polyzoa. It may therefore by chance have been erroneously referred to Shetland by E. Forbes, as it appears to be a Mediterranean and Atlantic form.

5. **Pustulopora clavæformis,** n. sp. (Plate XIV.)

Zoarium simple and club-shaped, or composed of three or four short club-shaped lobes; mouth of cells circular, slightly raised; surface finely punctured; oœcia —— ?

Hab. Algoa Bay, South Africa.

6. **Pustulopora intricaria,** n. sp. (Plate X. figs. 1 (pars) & 4.)

Zoarium constituted of short clavate branches, very irregularly disposed and united by frequent anastomoses, so as to form a dense intricate growth; cells slightly ventricose, deeply immersed, sometimes produced into rather long straight projecting tubes: oœcia ——?

Hab. South Australia (*Gould*).

This remarkable form is at once distinguished by its mode of growth in dense intricate masses of considerable size, and consisting of short branches spreading in all directions, and forming intricate anastomoses. In one specimen, about an inch in diameter, there may be seen in the interstices of the growth abundance of *Idmonea parasitica*, which in many places seems to be as it were continuous with the substance of the *Pustulopora*.

Other species noticed by Authors or not fully determined.

7. **Pustulopora gallica,** D'Orb. (sp.).

"Three times as large as *P. proboscidea*, with numerous cells projecting on all sides, and much longer than the diameter of the branches—much crowded, especially at the extremity of the branches."

Entalophora gallica, *D'Orb. Pal. Franç.* p. 781.

Hab. Coast of France, outside the Ile de Ré, shore of Calvados; Newfoundland (*D'Orb.*).

8. **Pustulopora indica,** D'Orb. (sp.).

"Zoarium as slender as in *P. proboscidea*, but with eight lines of cells, all visible on the exterior, notwithstanding the transverse rugæ which occupy the spaces between the apertures."

Entalophora indica, *D'Orb. Pal. Franç.* p. 781.

Hab. Strait of Malacca.

9. **Pustulopora deflexa,** Couch (sp.).

"Zoarium erect, cylindrical, with waved tubes projecting from all parts."

Pustulipora deflexa, *Johnst. l. c.* p. 279, pl. 48. fig. 5; *Norman, Report*, 1868, p. 310.
? Pustulopora deflexa, *Heller, l. c.* p. 125.
Tubulipora deflexa, *Couch, Corn. Faun.* p. 107, pl. 19. fig. 5.

Hab. Cornish coast; Plymouth; Shetland (*Peach*, fide *Alder*).

As it is impossible to make any thing out of Mr. Couch's very bad figure, except that it represents something altogether different from that shown in Dr. Johnston's, and as I have seen no authentic specimen of this species, its existence as a distinct form must for the present remain undecided. Like *P. orcadensis*, it may prove to be the same as M. d'Orbigny's *P. gallica*. Dr. Johnston doubts whether it may not be a form of *Tubulipora serpens*; but this seems very unlikely.

10. **Pustulopora orcadensis**, Bk.

=Hornera violacea, *Sars.*
Pustulopora orcadensis, *Busk, Q. J. Mic. Sc.* viii. p. 214, pl. 39. figs. 1 & 2 (1860).

B. *ADNATÆ* s. *DECUMBENTES.*

Family III. TUBULIPORIDÆ, Bk.

Zoarium either entirely adnate or attached by a broad base, and partially erect, linear, reniform, flabelliform, simple, or divided into branches or lobes. Cells tubular, distinct, more or less free Oœcia represented by a uniform inflation of part of the zoarium.

Tubuliporidæ, *Bk. Crag Polyzoa.*
Tubuliporadæ, *Bk. Engl. Cyclop.* art. "Polyzoa," col. 15.
Tubuliporidæ (pars), *Johnston, Blainville, M.-Edwards* (Tubulipores), *Smitt, Alder, Gray, &c.*
Sparsidæ (pars), *D'Orb.*

1. **ALECTO**, Lamx.

Zoarium closely adnate throughout, simple or irregularly branched; branches linear or ligulate; cells disposed in a simple series or in more or less regular transverse rows of from two to four.

Alecto, *Lamx. Exp. Méth.* p. 84 (1821); *Blainville, Man. d'Actin.* p. 464; *Johnston*; *M.-Edwards*; *Busk, Crag Polyz.* p. 112; *Michelin*; *Gray*; *Norman*; *Heller.*
Tubulipora (pars), *Lamarck, Smitt.*
Stomatopora, *Bronn, D'Orbigny.*
Aulopora (pars), *Goldfuss, Reuss.*
Diastopora (pars), *Smitt.*
? Proboscina (pars), *Smitt, D'Orbigny.*

1. **Alecto major**, Landsb. (Plate XVII. figs. 3–5, and ? Plate XVI. fig. 3.)

Cells bi- to triserial, immersed; surface smooth.

Alecto major, *Johnst. B. Zooph.* 2nd ed. vol. i. p. 281, pl. 49. figs. 3 & 4.
Alecto repens, *Wood, Ann. N. Hist.* xiii. p. 144; *Busk, Crag Pol.* p. 112, pl. 20. fig. 8.
? Alecto dichotoma, *Landsb.*
? Tubulipora trahens, *Couch* (non *Smitt, Œfversigt*, 1866, p. 403).
? Proboscina marginata, *D'Orb. Pal. Franç.* pl. 759. figs. 4 & 5.

Hab. British and Irish coasts; Scandinavian and Arctic seas.

2. **Alecto dilatans**, W. Thomps. (Plate XXXII. fig. 2.)

Branches dilated at the extremity; cells multiserial (about four rows).

Alecto dilatans, *W. Thomps.*; *Johnst. l. c.* p. 281, pl. 49. figs. 5–8; *Busk, Crag Pol.* p. 112, pl. xx. figs. 6 & 7.
Diastopora repens (var. β), *Smitt, l. c.* p. 396, pl. viii. figs. 1–6.
? Diastopora echinata, *Reuss, Foss. Pol. Wien. Tertiärb.* p. 52, pl. vii. figs. 14 & 15.
? Idmonea divaricata, depressa, cenomana, elegans, *D'Orb.*

Hab. British and Irish coasts; coast of Norway, &c.

3. **Alecto granulata**, M.-Edw. (Plate XXXII. fig. 1.)

Cells uniserial, subventricose; walls granular; branches linear, frequently anastomosing.

Alecto granulata, *M.-Edw. l. c.* p. 13, pl. 16. fig. 3; *Johnston, l. c.* p. 280, pl. 49. figs. 1 & 2; *W. Thompson (MS.)*; *D'Orbigny, Pal. Franç.* pl. 628. figs. 5–8.
? Tubulipora trahens, *Couch, Corn. Faun.* iii. p. 105, pl. 19. fig. 5 (very bad).
Stomatopora granulata, *D'Orb., Pal. Franç.* p. 836.
? Stomatopora incrassata, *id. ib.* p. 837.
Tubulipora (*subgen.* Proboscina, *Aud.*) incrassata (var. β. *forma* serpens), *Smitt, l. c.* p. 402.

Hab. British and Irish coasts; coasts of Norway and Sweden (on shells and stones).

2. **TUBULIPORA**, Lamk.

Zoarium usually springing from a single minute subglobular cell, and expanding as it grows into an irregularly lobate or entire, reniform or fan-shaped, adnate growth. Cells elongated, tubular, distinct, partially free and ascending, disposed irregularly in more or less regular divergent series.

Tubulipora, *Busk, Engl. Cyclop.* art. "Polyzoa," col. 15; *Crag Pol.* p. 110; *Lamouroux*; *Hagenow.*

Tubulipora (pars), *Lamarck, Blainville, M.-Edwards, Johnston, Lonsdale, Michelin, Reuss, D'Orbigny, Gray, Smitt.*
Ceriopora (pars), *Hagenow.*
Phalangella (sp.), *Gray.*
Obelia (pars), *Gray.*
Diastopora (sp.), *M.-Edwards.*
Criserpia (sp.), *M.-Edwards, &c.*
Reptotubigera, *D'Orbigny.*

1. **Tubulipora phalangea,** Couch. (Plate XXIII.)

Zoarium closely adnate, suborbicular or reniform, or obsoletely lobate; tubular cells long, slender, erect, in radiating irregular simple series.

Tubulipora phalangea, *Couch, Corn. Faun.* iii. p. 106, pl. 19. fig. 7; *Johnston, l. c.* p. 273, pl. 46. figs. 1 & 2; *Busk, Crag Pol.* p. 111, pl. xviii. fig. 6.
Tubulipora verrucaria, *M.-Edwards, l. c.* p. 12, fig. 1 (only); *Hassall, An. Nat. Hist.* 1841, vi. p. 171, pl. vi. figs. 3 & 4.
Tubulipora fimbriata, *M.-Edw., Lamk.*
Phalangella phalangea, *Gray, List B. Rad.* p. 139 (appendix, p. 149).
Tubulipora flabellaris (pars), *Smitt, l. c.* p. 401, pl. ix. fig. 6.
Tubipora flabellaris, *Fab. Faun. Grœnl.* p. 430.

Hab. British and Irish coasts; Arctic Sea; coast of Norway.

2. **Tubulipora flabellaris,** Johnst. (Plates XXIV., XXV.)

Zoarium adnate, fan-shaped, often recurved on the sides; cells decumbent, irregularly disposed or obscurely serial.

Tubulipora flabellaris, *Johnst. l. c.* p. 274, pl. 46. figs. 5, 6; *Smitt* (pars).
? Tubipora flabellaris, *Fab.*
? Proboscina latifolia, *D'Orb. Pal. Franç.* p. 847.

Hab. Coasts of Britain and Ireland; coast of Norway; (fossil) Crag.

The chief distinction between *T. phalangea* and *T. flabellaris*, which are, perhaps, hardly distinct specifically, consists in the greater length and slenderness of the tubes in *T. phalangea*, and their far greater tendency in that form to assume a serial arrangement, the series, when the zoarium is lobed, appearing to run laterally from a mesial line down the middle of each lobe or division (as in *T. serpens*). Prof. Smitt appears to have included both forms under *T. flabellaris*, as there is little doubt Fabricius did, and they are probably not far wrong.

3. **Tubulipora serpens,** Linn. (Plate XXII.)

Zoarium composed of curved strap-shaped lobes or branches, which divide more or less dichotomously; decumbent, but usually very slightly attached; cells disposed in transverse series, diverging on either side from a mesial line.

"Small purple Eschara," *Ellis, Corall.* p. 74, pl. 27 *e*, E.
Tubipora serpens, *Linn., Jameson.*
Millepora liliacea, *Pallas.*
Millepora tubulosa, *Soland.*
? Cellepora ramulosa, *Esper*, pl. 5.
Tubulipora transversa, *Lamarck*; *Johnst. Trans. Newc. Soc.* ii. p. 269; *Blainville, Man. d'Act.* p. 424; *Lamx. Expos. Méth.* pl. 64. fig. 1 (from *Ellis*).
Obelia tubulifera, *Lamx.* pl. 80. fig. 7; *M.-Edwards, l. c.* pl. 12. fig. 3.
Tubulipora foraminulata, *Blainv. Man. d'Act.* p. 425, pl. 62. fig. 3, 3 *a*.
Tubulipora serpens, *Fleming*; *Couch*; *Johnst. B. Zooph.* vol. i. p. 275, pl. 47. figs. 4–6.
Idmonea serpens, *Van Beneden*; *Bull. de l'Acad. d. Brux.* t. xvi. p. 647, pl. 1. fig. 7; *Smitt* (subg.), *l. c.* p. 399, pl. iii. figs. 1–5, and pl. ix. figs. 1, 2.
Reptotubigera tubulifera, *D'Orb. Pal. Franç.* p. 752.
Tubulipora lobulata, *Hassall, An. N. H.* vii. p. 367, pl. 10. figs. 1, 2; *Johnst. B. Zooph.* vol. i. p. 272; *Smitt, l. c.* p. 400.

Hab. British coasts (ubique), usually on *Fucus*; Scandinavian seas (*Smitt*); Spitzbergen.

4. **Tubulipora fungia**, Couch. (Plate XXXII. fig. 3.)

Zoarium fungiform, suberect or decumbent, and spreading in irregular lobes; cells disposed very irregularly, and opening chiefly at the dilated ends of the lobes; free portion very short or obsolete; mouth annular, with a slightly thickened margin.

Tubulipora fungia, *Couch, Corn. Faun.* iii. p. 107, pl. 19. fig. 3.
Tubulipora penicillata, *Johnst. l. c.* p. 271, pl. 48. figs. 1, 2.
Tubulipora (*subgen.* Proboscina) fungia, *Smitt, l. c.* p. 403, pl. x. figs. 2, 5.
Tubipora penicillata, *Fab. F. Grænl.* p. 429.

Hab. Northern coast of Britain; Arctic Sea (*Smitt*); Finmark, 50 fathoms; Hamilton's Inlet, Labrador (*Wallich*); Banff (on stone); coast of Devon (*Hincks*).

5. **Tubulipora ventricosa**, Bk. (Plate XXXII. fig. 4.)

Zoarium pyriform, simple, suberect or decumbent, attached by its contracted portion, which rapidly expands into a hollow vesicle (oœcial); cells disposed irregularly.

Tubulipora ventricosa, *Bk. Quart. Journ. Mic. Sc.* vol. iii. p. 256, pl. ii. figs. 3, 4.
Tubulipora (*subgen.* Proboscina) incrassata (var. *a.* forma erecta), *Smitt, l. c.* p. 402.

Hab. W. Greenland, on *Fucus* (*Dr. Sutherland, H.M.S. 'Sophia'*); Arctic and Norwegian seas (*Smitt*); Spitzbergen (*Lovén*).

Prof. Smitt gives *T. ventricosa*, mihi, as a synonym of his *Tubulipora* (*Proboscina*) *incrassata*, which again he regards as synonymous with *Filisparsa incrassata* of M. d'Orbigny; but I am unable to agree with him in these determinations. Several specimens of *T.*

ventricosa in my possession all exhibit very similar characters; and all are apparently of fully mature growth, as evidenced by the large oocœcial inflation. I have therefore little doubt of its specific distinction. That it has no relation to *Proboscina Lamouroux*ii of Audouin ('Egypte,' pl. vi. figs. 5, 5^2 *s*) is obvious at first sight, from the existence on the latter of distinct globose oocœcia, those organs in *T. ventricosa*, as in the other Tubuliporidæ, being represented by the ventricose inflation of the polyzoarium.

6. **Tubulipora pyriformis**, n. sp.

Zoarium closely adnate, pyriform; cells much immersed, coarse, short, very irregularly disposed.

Hab. Tasmania, on *Fucus* (*Mrs. Smith*).

Other species noticed by Authors.

7. **Tubulipora organizans**, D'Orb.

"*T.* tubulis trifasciculatibus."

Tubulipora organizans, *D'Orb. V. d. l'Amér. Mérid.* p. 19, pl. 9. figs. 1, 3.

Hab. Falkland Islands.

8. **Tubulipora (Proboscina) dichotoma**, D'Orb.

"*C.* ramosa, dichotoma, reptans; cellulis tubulosis, erectis, punctatis."

Tubulipora (Proboscina) dichotoma, *D'Orb. ib.* p. 19, pl. 9. figs. 7–31.

Hab. Falkland Islands.

9. **Tubulipora (Proboscina) malaccensis**, D'Orb.

"Branches like those of *P. fimbriata*, but half as large again, with numerous projecting cells."

Proboscina malaccensis, *D'Orb. Pal. Franç.* p. 847.

Hab. Straits of Malacca.

Family IV. DIASTOPORIDÆ, Bk.

Zoarium crustaceous or foliaceous, discoid or indefinite in outline, adnate and sessile or pedunculate, or erect; no cancelli.

Diastoporidæ (pars), *Bk. Crag Polyz.* p. 113; *Smitt.*

1. DIASTOPORA, Johnst.

Zoarium adnate, discoid or flabelliform, centric or excentric; margin entire or lobed; cells, towards the centre, wholly immersed, usually suberect and partially free towards the margin; mouth elliptical or suborbicular, horizontal or oblique.

"Diastopores simples," *M.-Edw. l. c.* p. 39.
Diastopora, *Johnston*; *Bk. l. c.* p. 113.
Diastopora (pars), *Lamx.*, *M.-Edw.*, *Blainville*, *Reuss*, *Hagenow*, *Michelin*, *D'Orbigny*, *Smitt*.
Tubulipora (sp.), *Johnst.*, *Auct.*

1. Diastopora simplex, Bk. (Plate XXIX. figs. 3, 4.)

Zoarium thin, papyraceous, orbicular or irregular; cells deeply and entirely immersed; mouth elliptical, nearly even with the surface; surface coarsely punctate; no adventitious tubules.

Diastopora simplex, *Bk. l. c.* p. 113, pl. xx. fig. 10; *Smitt, l. c.* p. 396, pl. viii. figs. 7, 8.
Diastopora obelia (pars), *Johnst.*, *Auct.*

Hab. Arctic Sea; coast of Finmark (*Smitt*); Macgilligan, Ireland (*W. Thomps.*); Beaufort Dyke, 110–145 fathoms (*Capt. Beechey, R.N.*).

2. Diastopora obelia, Johnst. (Plate XXVI.)

Zoarium adnate, usually slightly raised in the middle (or umbilicate), orbicular or of irregular outline; cells produced, partially free and erect; surface very finely punctate; a small adventitious tubule rising from the back of some of the cells.

Tubulipora obelia, *Johnst.* 1st ed. p. 269, pl. 38. figs. 7, 8; *Couch, Corn. Faun.* p. 108.
Diastopora obelia, *Johnst.* 2nd ed. p. 277, pl. 47. figs. 7, 8; *Sars*; *Landsb.*; *Alder*; *Hincks*; *Norman*; *Smitt* (1865), p. 10, pl. iv. figs. 15, 16.
Diastopora hyalina (var. *a.* obelia), *Smitt* (1866), p. 396, pl. viii. fig. 7–12.
Diastopora latomarginata, *Smitt, ib.* p. 397; ? *D'Orbigny, Pal. Franç.* p. 827, pl. 758. figs. 10–12.

Hab. Coast of Britain (ubique), on shell and stone; Guernsey; Jersey (*Norman*); North Sea and Arctic Ocean (*Smitt*); Coast of Norway (*Lovén, Sars*); Spitzbergen, on *Laminaria* (*Smitt*).

3. Diastopora patina, Lamk. (Plate XXIX. figs. 1, 2, Plate XXX. fig. 1.)

Zoarium, when mature, discoid, circular, cupped; central cells immersed and usually closed; marginal ones erect and open, usually disposed in irregular wavy lines radiating from the centre.

Tubulipora patina, *Johnst. l. c.* p. 266, pl. 47. figs. 1–3; *Gosse, Mar. Zool.* part 3, p. 8. fig. 1 (nec *Milne-Edwards*); *Lamarck.*
Tubulipora bellis, *W. Thomps.*

Patinella verrucaria, *Gray*, *List Brit. Rad.* p. 138.
Patinella patina, *Hincks*, *Zooph. S. Devon*, *An. N. H.* p. 468.
Diastopora patina, *Smitt*, *l. c.* p. 397.

Hab. Coasts of Britain, deepish water, frequent; Strangford Lough, Ireland (*W. Thomps.*), shallow water; North Sea; Arctic Ocean, on *Fucus*, *Flustra*, &c., 5–10 fathoms, and on shells and coral, from 50–100 fathoms (*Smitt*); coast of Norway (*Lovén*); South Norway (*Lilljeborg*); Finmark (*Sars*); Shetland (*Barlee*, *Norman*), 170 fathoms.

4. **Diastopora congesta**, D'Orb. (Plate XXXI. fig. 5.)

Zoarium discoidal ($\frac{1}{6}$ inch), cupped; cells decumbent—mouths raised, circular—disposed quincuncially; surface spotted; a secondary disk arising from the surface of the primary. (No adventitious tubules.)

Diastopora congesta *et* confluens, *Reuss.*
Diastopora glomerata *et* congesta, *D'Orb. l. c.* p. 878, pl. 636. figs. 4–6; *Prodrom.* (1847), p. 266.
Reptomultisparsa congesta, *D'Orb.* (1852) *l. c.* p. 878, pl. 640. figs. 1–6.
? Patinella proligera, *Bk. Crag Polyz.* p. 114, pl. xix. fig. 1, pl. xx. fig. 3.

Hab. Mediterranean, African shore (*H.M.S.* '*Porcupine*'). ? Fossil, Cretaceous, Étage Sénonien (*D'Orb.*).

2. **MESENTERIPORA**, Blainv.

Zoarium foliaceous, undulated; cells in two layers, parted by a calcareous septum, and opening on both surfaces.

1. **Mesenteripora meandrina**, Wood.

Zoarium subglobose, cavernous; foliations contorted, anastomosing.

Mesenteripora meandrina, *Smitt*, p. 398; *Bk. Crag Polyzoa*, p. 109, pl. xvii. fig. 2, pl. xviii. fig. 4, pl. xx. fig. 2.
? Mesenteripora eudesiana, *M.-Edw. l. c.* pl. 14. fig. 1.
? Mesenteripora michelinii, *Blainv. Man. d'Act.* p. 414.
? Mesenteripora dædalea, *Blainv. l. c.* p. 432.
? Mesenteripora neocomiensis, *D'Orb. Pal. Franç.* p. 808, pl. 756. figs. 7–9.
? Ceriopora compressa, *Goldf. Petref.* i. p. 37, pl. xi. fig. 4; *Blainv. l. c.* p. 414.

Hab. Greenland (*Torell*), 16–40 fathoms, on stone. ? Fossil: Cor. Crag; Chalk, Maestricht.

Not having seen any recent specimen of this species I am unable to describe it further. The above account and synonymy are taken from Prof. Smitt, *l. c.* p. 398, who does not give a figure.

Family V. DISCOPORELLIDÆ.

Zooœcium discoid, sometimes confluent, adnate or stipitate. Cells distinct or closely connate, intermediate surface cancellated or porous.

Lichenoporidæ, *Smitt.*
Caveidæ (pars), *D'Orb.*
Discoporadæ, *Bk. Brit. Cyclop.*

a. Zooœcium discoid, adnate.

1. DISCOPORELLA, Gray.

Zoarium sessile, usually closely adnate, with a thin calcareous border; discoid, raised in the centre (hemispherical, conical, or subconical). Cells partly free, disposed irregularly or in lines radiating from the centre. Mouth acuminate or toothed.

Discoporella, *Gray, List Brit. Rad.* p. 138; *Busk, Crag Polyz.* p. 115; *Smitt.*
Discopora (pars), *Fleming* (non *Lamarck*); *Busk, Encyclop. Brit.* "Polyzoa."
Madrepora (pars), *Fabr., Esper.*
Tubulipora (pars). *Johnst., M.-Edwards, &c.*
Defrancia (pars), Actinopora, Discocavea, Unicavea, &c., *D'Orb.*
Heteroporella (sp.), *Hincks.*

1. Discoporella hispida, Flem. (sp.). (Plate XXX. fig. 3.)

Zoarium closely adnate, suborbicular, or irregular, usually indistinctly mamillated; cells scattered, mouths of cells larger than the ostioles; peristome, especially in the marginal cells, commonly produced on one side, and simply acuminate or divided into 2–4 aculeate teeth.

Discopora hispida (pars), *Fleming, Blainv., Hassall, Couch.*
? Madrepora verrucaria (pars), *Fabricius.*
Tubulipora hispida, *Johnst. l. c.* p. 269 (second paragraph), pl. 47. fig. 9 (? 10, 11).
? Tubulipora orbiculus, *Lamarck.*
Discoporella hispida, *Bk. C. Polyz.* p. 115, pl. xviii. fig. 5; *Sars*; *Alder*; *Smitt, l. c.* p. 406, pl. xi. figs. 10–12; *Norman, &c.*
Heteroporella hispida, *Hincks, Zooph. S. Devon*, p. 469.

Hab. South coast of Britain; Etretât, France; North Sea and Arctic Ocean, 20–40 fathoms; Norway, Finmark (*Smitt*), &c.

Mr. Hincks (whose opinion is entitled to very great weight) and Mr. Holdsworth appear to entertain the opinion that *Discoporella hispida* should be referred to *Heteroporella* (mihi); and in one sense, perhaps, they are right. I now think, however, that that genus as exemplified in the Crag form *H. radiata*, should be abolished, and that species be regarded merely as a much-worn *Discoporella*. At any rate there can be little doubt that in the true

Discoporella hispida when fresh and uninjured the peristome is produced as in the other *Discoporellæ*, and usually divided into from 2–4 delicate aculeate spines.

Dr. Johnston, and probably most other writers, appear to have confounded *D. hispida*, as here understood, with *D. verrucaria*, Linn. These two forms, however, can be at once distinguished by the larger size of the zooœcial cells in the latter, in which also they are arranged more or less regularly in radiating lines, and by the peristome being usually bifid or simply acuminate.

2. **Discoporella verrucaria**, Fab. (Linn.). (Plate XXVIII. figs. 2, 3).

Zoarium discoid, hemispherical or subconical; cells towards the centre elongated and frequently arranged in radiating lines, and quincuncially toward the periphery; peristome simply acuminate or bifid (rarely trifid).

Tubulipora hispida (pars), *Johnston, l. c.* p. 268; *Fleming.*
Madrepora verrucaria (*Linn.*?), *Fabric. Faun. Grœnl.* p. 430.
? Discosparsa hispida, *Heller.*
Discoporella verrucaria, *Smitt, l. c.* p. 405, pl. x. figs. 6–8, pl. xi. figs. 1–6.

Hab. Orkney (*Barlee*); Arran; Hamilton's Inlet, Labrador, Rekiavic, Greenland, 10–20 fathoms (*Wallich*); Assistance Bay, Greenland, 74° 50′ N., 94° 16′ W. (*H.M.S.* '*Sophia*,' *Dr. Sutherland*); coast of Norway (*Lovén*); Spitzbergen (*Smitt*). On *Fucus.*

Prof. Smitt gives Mr. Hincks's *D. flosculus* as a synonym; but the two appear to me to be quite distinct.

3. **Discoporella algoensis**, n. sp. (Plate XXVIII. figs. 1, 4.)

Discoid; cells disposed in radiating uniserial lines, mouth elliptical, lower side of peristome produced into an acuminate point. Interstitial pores small, sparse.

Hab. Algoa Bay, on *Catenicella.*

The peculiar way in which the mouths of the cells are bevelled off on the upperside is very distinctive of this species. In all other cases that have come under my notice the bevelling is on the lower side of the mouth.

4. **Discoporella ciliata**, n. sp. (Plate XXX. fig. 6.)

Discoid; cells uniserial, 4–6 in each row; diameter of mouth less than that of the interstitial cancelli; peristome much produced on one side, nearly vertical, divided into several (2–4) long acute, slender spines.

Hab. Cape of Good Hope, on *Retepora* (*Tumanowicz*); New Zealand, on *Hornera* (*Dr. Lyall*).

The upright, half-tubular, aculeated peristome and the very large size of the angular cancelli are very characteristic. The figure of

Discocavea aculeata, D'Orb. Pal. Franç. p. 958, pl. 776. figs. 5–8 strongly resembles this species.

5. **Discoporella novæ-zelandiæ**, n. sp. (Plate XXX. fig. 2.)

Discoid, cupped; cells tubular, projecting, connate in uniserial radii; peristome bifid; central area (unoccupied by cells) depressed; cancelli large, becoming smaller towards the periphery.

Hab. New Zealand, (? always) on a *Catenicella* (*Dr. Lyall*).

A small species, rarely exceeding $\frac{1}{8}$ inch in diameter. The much-raised slender series of upright connate tubes with a bifid mouth, and the comparatively very large central cancelli, are the main characteristics of this abundant species.

6. **Discoporella fimbriata**, n. sp. (Plate XXVII.)

Zoarium almost conical; cells very indistinctly serial, distant; interstitial pores almost obsolete; mouth expanded; peristome fimbriated.

Hab. Chonos archipelago, 13 fathoms; Tierra del Fuego; Cape Horn, 40 fathoms; Chiloe, 96 fathoms (*Darwin*); Tasmania (*Mrs. Smith*) (fig. 1).

7. **Discoporella californica**, D'Orb. (Plate XXX. fig. 5.)

Zoarium orbicular, thick, depressed in the centre; cells disposed in bi- to triserial radii, alternately longer and shorter, and much raised; cells connate throughout, thence hexagonal; central area and interserial spaces widely reticulate; mouths of cells less than the cancelli.

Unicavea californica, *D'Orb. Pal. Franç.* p. 972.

Hab. San Diego, California (*Dr. P. Carpenter*); off Milva Maura, San Pedro, California (*Dr. Palmer*).

8. **Discoporella radiata**, Audouin (sp.). (Plate XXXIV. fig. 3.)

Zoarium orbicular, convex, with the centre flat or depressed; cancelli small and sparse, not stellate. Cells connate, disposed in much-raised uniserial rays alternately long and short; mouths obscurely mucronate. A single row of circular pores between the rows of cells.

Melobesia radiata, *Audouin, Egypte*, t. i. p. 235, pl. 6. fig. 3.
Unicavea radiata, *D'Orb. l. c.* p. 971.
Discocavea verrucaria, *id., ib.* p. 958.
Discoporella flosculus, *Hincks, Zooph. S. Devon, An. N. H.* 3rd ser. vol. ix. p. 468, pl. xvi. fig. 3.
Tubulipora patina, *M.-Edw. l. c.* p. 9, pl. xiii. fig. 1.
Discosparsa patina, *Heller, Bryoz. Adriat.* p. 122.

Hab. Mediterranean? (*Savigny, H.M.S.* '*Porcupine*'); Adriatic, (*Heller*); South Devon (*Hincks*).

9. **Discoporella mediterranea**, Blainville. (Plate XXXIV. fig. 4.)

Zoarium orbicular, umbonate, but hollowed in the centre, around which the cells are arranged in short multiserial rays, most of which do not reach the border of the disk; entire surface reticulate. Mouths of cells and openings of cancelli of equal size and almost indistinguishable.

Lichenopora mediterranea, *Blainv. Man. d'Actinol.* p. 407 (no figure or description); *Michelin, Icon.* (1844), p. 68, pl. xiv. fig. 5.
Actinopora mediterranea, *D'Orb. Prodr.* iii. p. 188 (1847).
Unicavea mediterranea, *id. ib.* p. 971 (1852).

Hab. Mediterranean, on shell (*H.M.S.* '*Porcupine*,' *Blainville, Michelin, D'Orbigny*). Fossil, Miocene: Astezan, Asti, Vaucluse.

10. **Discoporella holdsworthii**, n. sp. (Plate XXX. fig. 4.)

Discoid, convex, bordered; cells uniserial, two to six in each series; orifice elliptical, peristome pointed on the lower side. Central area wide, with numerous large circular stellate pores.

Hab. Ceylon, on dead shell (*Holdsworth*).

Other species noticed by Authors.

11. **Discoporella convexa**, D'Orb.

"Very convex above; cells in irregular lines, very slightly projecting; intermediate pores very distinct and numerous."

Unicavea convexa, *D'Orb. l. c.* p. 972.

Hab. Coast of Calvados.

12. **Discoporella novæ-hollandiæ**, D'Orb.

"Much depressed; rays wide apart, much raised and very wide, with two ranges of intermediate pores."

Unicavea novæ-hollandiæ, *D'Orb. l. c.* p. 971.

Hab. Bay of Chiens-Marins (? Seal Bay), New Holland.

13. **Discoporella complanata**, Meneghini.

"Discoid, flat, not hollowed in the centre; the whole surface furnished with rows of tubes radiating from the centre towards the periphery; tubes slightly curved, of almost equal length."

Tubulipora complanata, *Meneghini, Polipi dell. Famiglia dei Tubuliporani, finora osservati nell' Adriatico*, 1844, p. 5.
Discosparsa complanata, *Heller, l. c.* p. 122.

Hab. Adriatic.
Probably = *D. radiata*.

14. Discoporella annularis.

"Discoid, hollowed in the centre, surrounded by a raised border; outer border thin and wide. The whole surface, in the centre as well as on the raised portion, furnished with tubes arranged more or less distinctly in rays; the tubes, though less closely aggregated than in *D. complanata*, are wider apart in the centre than on the annular elevation; apertures round, unarmed."

Discosparsa annularis, *Heller, l. c.* p. 123.

Hab. Adriatic.
Probably = *D. mediterranea*.

15. Discoporella mellevillensis, D'Orb.

"Much depressed, flattened beneath, convex above; rays elevated, wide apart, and few in number."

Discocavea mellevillensis, *D'Orb. Pal. Franç.* p. 959.

Hab. Port Melleville (? Melville).
M. d'Orbigny's *Tubulipora* (*Unicavea*, 1852) *clypeiformis* (Voy. d. l'Amér. Mér. Polypiers, p. 19, pl. 9. figs. 4–6) appears to be merely the young state of a *Tubulipora* like *T. flabellaris* (*vide* Plate XXIV. fig. 1).

2. TENNYSONIA, Busk.

Zoarium stipitate, irregularly branched or lobate; lobes subtriangular, forked at the end; orifices of cells even with the surface, arranged in straight uniserial lines from the median angle to the border of the lobe; interspaces porous.

Tennysonia, *Busk, Quart. Journ. Mic. Sc.* vii. (1867), p. 240, pl. 36.

1. Tennysonia stellata. (Plate XXXI. fig. 6.)

The only species.

Hab. Cape of Good Hope (*Mrs. Gatty*).
This form is placed very doubtfully in the present family, and should probably be regarded as a *Heteropora*.

3. RADIOPORA, D'Orb.

Zoarium adnate, crustaceous, spreading irregularly, and composed of confluent disks like those of *Discoporella*; surface reticulate or cancellous; cells disposed in serial lines radiating from the centres of the constituent disks.

Radiopora, *D'Orb.*, 1847, *Pal. Franç.* p. 992.

In the majority of the fossil species referred by M. d'Orbigny to his genus *Radiopora*, the zoaria are more or less rounded or bulbous,

owing to the superposition of layer upon layer of the confluent disks; but in one—*R. Francquana* (*l. c.* p. 997, pl. 782. figs. 3–8)—this superposition would seem to have taken place only to a very slight extent. In the two living forms I have referred to the same genus there is no superposition at all; but as the mode of growth is in other respects so exactly in accord with M. d'Orbigny's excellent description, I have not thought it expedient to institute another genus, or even subgenus, merely on that account.

1. **Radiopora simplex**, n. sp. (Plate XXXIV. fig. 2.)

Rays uniserial, vertical; mouths of cells and cancelli of the same size; peristome entire. (Specimen much worn.)

Hab. Mazatlan (*Dr. P. Carpenter*).

2. **Radiopora cristata**, n. sp. (Plate XXXIV. fig. 1.)

Rays bi- to triserial; cells at inner ends of rays very long, gradually shortening outwards; erect, connate; mouth sharply mucronate on one side, sometimes bimucronate; pores orbicular.

Hab. John Adams's Bank, South Atlantic (*H.M.S.* '*Herald*;' *Macgillivray*).

4. DOMOPORA, D'Orb.

Zoarium massive, cylindrical, simple and mammiform or obtusely lobed, constituted of successive growths one upon the other; cells disposed in radiating lines on the free rounded extremity of the stem or lobes, or circularly round the margin; rays uni- or multiserial; surface everywhere reticulated with hexagonal pits.

Domopora, *D'Orb.*, 1847, *Pal. Franç.* p. 986.
Defrancia (pars), *Reuss*, *Hagenow* (nec *Bronn*), *Sars.*
Stellipora (pars), *Hagenow.*
Tubulipora (pars), *Johnst.*, *Fleming.*
Millepora (pars), *Jameson.*
Coronopora, *Gray* (1848), *Sars*, *Smitt.*
Corymbopora, *Smitt* (nec *Michelin*).

1. **Domopora truncata**, Jameson. (Plate XXXI. fig. 1, 2.)

Zoarium simple or lobed (proliferous); cells disposed in 12–14 elevated biserial rays on the rounded extremity of the trunk or lobes.

Millepora truncata, *Jameson*, *Wern. Mem.* i. p. 560 (nec *Fabricius*, nec *auct.*).
Tubulipora truncata, *Fleming*; *Johnst. B. Zooph.* p. 271, pl. xxxiii. figs. 8–10; *Blainv.*
Coronopora truncata, *Gray*, *List B. Rad.* p. 140; *Sars*, *Reise Löf. Finm.* p. 145; *Busk*, *Rep. Brit. Assoc.* 1859, *Trans. Sect.* p. 146.
Corymbopora fungiformis, *Smitt*, *Overs.* 1866, pp. 407 & 490, pl. xi. figs. 13 & 14.

Defrancia truncata, *Sars, Beskrivel. Norsk. Polyz. Vid. Selskab. Förh.* 1862, p. 20.
Defrancia stellata, *Busk, An. N. Hist.* 2nd ser. vol. xviii. p. 36, pl. i. fig. 9.
Ceriopora stellata, *Goldf. Petref.* i. p. 39, pl. 30. fig. 12 (t. *Smitt*).

Hab. Deep water; coast of Norway, 40–60 fathoms (*Rasch, Sars*); Norway and Finmark (*M'Andrew* !)

2. **Domopora annulata**, n. sp. (Plate XXXI. fig. 3.)

Zoarium simple, mammiform; mouths of cells disposed in rings around the trunk, marking the edges of each successive growth.

Hab. John Adams's Bank, South Atlantic (*H.M.S. 'Herald;' Macgillivray*).

Readily distinguished from *D. truncata* by the annulated aspect of the stem and the absence of rays at its extremity. It might well form the type of a distinct genus or subgenus.

5. **DEFRANCEIA**, D'Orb.

Zoarium stipitate; capitulum cupped. Cells disposed in elevated rays extending to the margin of the cup; central portion of cup and interserial spaces cancellate. Outer surface of capitulum and stem pitted (sometimes smooth).

Pelagia, *Lamouroux*, 1821 (non *Blainville*, 1803).
Defranceia, *D'Orb. l. c.* p. 680.
Defrancia (pars), *Bronn, Römer, Reuss, Hagenow, Geinitz, &c.; Busk, Crag Polyz.*
Defrancia, *Smitt, Overs.* 1866, pp. 408 & 493.
Lichenopora (pars), *D'Orb.*
Discofascigera, *D'Orb.*

1. **Defranceia lucernaria**, Sars. (Plate XXXIII. fig. 3.)

Rays short, widening towards the outer end, multiserial; cancelli wide, irregular; outer surface pitted; pits oblong.

Tubulipora lucernaria, *Sars, Reise Lof. Finm.* p. 145.
Defrancia lucernaria, *Sars, Beskriv. N. Polyz.* p. 26; *Smitt, l. c.* p. 408.
Defrancia truncata, *Busk, An. N. Hist.* 2nd ser. vol. xviii. p. 35, pl. 1. fig. 5.
Discofascigera cupula, *D'Orb. Pal. Franç.* p. 675 (from Spitzbergen).

Hab. Coast of Norway and Finmark (*M'Andrew, Sars*); Spitzbergen, 40–60 fathoms; Umenak, Greenland, 250 fathoms; Julian Hafen, 130 fathoms.

Family VI. FRONDIPORIDÆ.

Zoarium massive, stipitate, simple or lobed, or ramose. Cells connate, aggregated into fasciculi, and continuous throughout the length of the fasciculus, at the extremity of which only they open; walls of cells porous; no intermediate pores or cancelli.

Fasciculinea (pars), *D'Orbigny*; *Smitt, Overs.* 1866, p. 487.
Fascigeridæ (pars), *D'Orbigny, l. c.* p. 664.
Frondiporidæ *et* Corymboporidæ (pars), *Smitt, l. c.* pp. 407, 488.
Ceriporidæ (pars), *Busk, Crag Polyz.* p. 118.
Cerioporina (pars), *Hagenow, Maast. Kreideb.* p. 35.

1. **FASCICULIPORA**, D'Orb.

Zoarium stipitate; capitulum simple or lobate.

Fasciculipora, *D'Orbigny* (1839), *l. c.* p. 667.
Frondipora, *Michelin*, (pars) *Hagenow.*
Corymbopora, *Michelin.*
Corymbosa, *D'Orbigny.*
Fungella, *Hagenow*; *Busk, Crag Pol.* p. 118.

1. **Fasciculipora digitata**, n. sp. (Plate XXXIII. fig. 1.)

Capitulum cupped; fasciculi in the form of subcylindrical, digitiform processes rising from the border of the cup; outer surface smooth or obscurely striated.

Hab. Cape Capricorn, Australia, 13 fathoms (*H.M.S.* '*Rattlesnake*').

2. **Fasciculipora ramosa**, D'Orb. (Plate XXXIII. fig. 2.)

Zoarium fungiform; capitulum composed of numerous rounded lobes (usually in pairs); each lobe constituted of a thick fasciculus of tubular cells of large calibre, with a few smaller tubes scattered amongst them; outer surface smooth, dotted, showing the outlines of the elongated cells.

Fasciculipora ramosa, *D'Orbigny, Voy. Amér. Mér. Polypiers*, p. 20, pl. ix. figs. 22–24.
? Frondipora ramosa, *Hagenow.*
Corymbosa ramosa, *D'Orb. Cours Elém. de Pal.* t. ii. p. 109 (1851).
? Fungella prolifera, *Hagenow, Maast. Kreideb.* p. 37, pl. iii. figs. 6 & 7 ?

Hab. South Patagonia, 48 fathoms (*Darwin, D'Orbigny*).

F. ramosa bears close resemblance to *Fungella multifida*, mihi, of the Crag (*l. c.* p. 119, pl. 17. fig. 4); but in that species, which corresponds with *Frondipora marsigli* of M. Michelin (Iconog. p. 68, pl. 14. fig. 4), the whole growth appears more squat or depressed, and the lobes shorter and not in pairs; whilst the outer surface towards the base is marked with hexagonal areolæ, an

appearance not exhibited in *F. ramosa*. Otherwise the two forms seem to be closely allied.

2. **FRONDIPORA**, Imperato.

Zoarium pedunculate, ramose; fasciculi opening only on one side of the branches in raised patches.

Frondipora, *Imperato* (1599); *Blainville*; *D'Orb. l. c.* p. 676; *Smitt*; *Busk.*
Millepora (pars), *Linn.*, *Pallas.*
Retepora (pars), *Lamarck.*
Krusensterna, *Tilesius*, *Lamx.*
Rhizophora, *D'Orb.* (1849).

1. **Frondipora reticulata**, Blainv. (Plate XXI.)

Branches subcylindrical, dichotomous, and forming frequent anastomoses, so as to constitute an irregularly convoluted reticulate growth; the extremities of the fasciculi form elongated, confluent protuberances; dorsal surface longitudinally striated and finely punctured.

Frondipora, "Porus frondosus," Crusta marina, *Imperato* (1599), p. 631, *Bacchini.*
Frondipora Bauhini (1650), *Bauhin*, *Hist.* iii. p. 809.
Frondipora reticulata, *Blainv. Man. d'Actin.* p. 406, pl. 69. fig. 1; *D'Orb. Pal. Franç.* p. 677; *Smitt*, *l. c.* p. 407.
Millepora reticulata (pars), *Linn.*
Millepora frondipora, *Pallas.*
"Madrepore rameux" &c., *Marsigli*, *Hist. d. Mer*, p. 150, pl. 34. fig. 165.
Retepora reticulata, *Lamk.*
Krusensterna verrucosa (pars), *Lamx. Expos.* pl. 26. fig. 5 (non p. 74, figs. 10, 13).

Hab. Mediterranean (very abundant).

2. **Frondipora palmata**, n. sp. (Plate XX. figs. 4, 5.)

Zoarium stipitate; trunk short and thick, spreading out into several horizontal lobes, which are digitate on the sides; fasciculi continuous along the lobes and branches; dorsal surface reticulato-punctate.

Hab. Australia?

I have unfortunately no certain knowledge of the locality whence this very distinct species was brought, but have great reason to believe that it formed part of the 'Rattlesnake' collection.

Other species noticed by Authors.

3. **Frondipora verrucosa**, Lamx.

Fasciculi opening in distinct verrucose elevations; (dorsal surface transversely striated? *M.-Edw.*).

Krusensterna verrucosa, *Lamx. Expos.* p. 41, pl. 74. figs. 10, 13 (nec pl. 26. fig. 5); *D'Orbigny, l. c.* p. 678.
Frondipora verrucosa, *Blainv.*
Frondipora reticulata, var. *β*, *Smitt, l. c.* p. 407.

Hab. Kamtschatka, Spitzbergen (*Tilesius, D'Orbigny*).

The principal apparent difference between *F. reticulata* and *F. verrucosa* consists in the circumstance that in the latter the ends of the fasciculi form isolated verrucose elevations; whilst in the former they form elongated, irregular, confluent projections.

Professor Smitt regards this difference as sufficient only to constitute a variety; and, in the absence of further information respecting the Arctic form, his opinion would seem to be very probably correct.

Besides Kamtschatka, for which locality M. Lamouroux quotes the authority of Tilesius, he also mentions the East Indies and Australia as habitats for *Krusensterna verrucosa*; but upon what authority does not appear.

Dr. Solander is quoted for the East-Indian habitat; but as the form figured in Ellis and Solander, pl. 26. fig. 5, undoubtedly represents the common Mediterranean species, and as Ellis left no explanation or description of the objects figured in that plate, and Dr. Solander's description of *Millepora reticulata* (p. 138) cannot apply to fig. 5, but to a Retepore, it is clear that Lamouroux has no authority from him for assigning the East Indies as a locality for *K. verrucosa*.

As regards Australia, M. de Blainville remarks that Lamouroux must in all probability also have fallen into a mistake, as the species is not noticed by Lamarck amongst those in the collection brought home by Péron and Lesueur.

If really distinct therefore, which is not impossible, from *F. reticulata*, *F. verrucosa* is strictly an Arctic form. It does not, however, appear to have occurred amongst the Arctic Polyzoa brought under the notice of Prof. Smitt.

4. **Frondipora marsigli**, Blainv.

M. de Blainville (Man. d'Actinol. p. 406) merely cites Marsigli's incorrect figure of *F. reticulata* as representing this supposed species; and as he gives no reason for regarding it as distinct, the name should probably be altogether expunged.

The *Frondipora marsigli* of Michelin (Iconog. p. 68, pl. xiv. fig. 4) is *Fungella* (*Fasciculipora*), mihi.

EXPLANATION OF THE PLATES.

Plate	fig.	
I.	1–4.	Crisidia cornuta, var. geniculata.
	5–10.	—— cornuta.
II.	1, 2.	Crisia eburnea.
	3, 4.	—— denticulata.
	5–8.	—— edwardsiana.
III.	1–6.	—— denticulata.
IV.	1–4.	—— denticulata.
	5, 6.	—— elongata.
	7–11.	—— sinclarensis.
V.	1, 2.	—— eburnea.
	3, 4.	—— acropora.
	5–10.	—— eburnea, var.
VI.		—— eburneo-denticulata.
VI. A.	1, 2.	—— fistulosa.
	3, 4.	—— tubulosa.
	5.	—— conferta.
VI. B.	1.	—— margaritacea.
	2.	—— holdsworthii.
	3.	Pustulopora delicatula.
VII.	1–4.	Idmonea radians.
	5, 6.	—— gracillima.
	7, 8.	—— marionensis, young.
VIII.		—— contorta.
IX.		—— atlantica.
X.	1, 4.	Pustulopora intricaria.
	2, 3.	Idmonea parasitica.
XI.		—— milneana.
XII.		—— irregularis.
XII. A.		—— notomala.
XIII.	1, 2.	Retihornera foliacea, var.
	3–5.	Idmonea marionensis.
XIV.		Pustulopora clavæformis.
XV.		Hornera cæspitosa.
XVI.	1, 2.	Eschara, sp.?
	3.	Alecto major.
XVII.	1, 2.	Pustulopora parasitica.
	3–5.	Alecto major.
XVII. A.	(left).	Pustulopora australis.
	(right).	—— proboscidea.
XVIII.	1.	Hornera violacea, var. proboscina.
	2–4.	—— ——, var. tubulosa.
	5, 6.	—— lichenoides.
XIX.		Retihornera foliacea.
XX.	1–3, 6.	—— frondiculata.
	4. 5.	Frondipora palmata.
XXI.		—— reticulata.

Plate	fig.	
XXII.		Tubulipora serpens.
XXIII.		—— phalangea.
XXIV.		—— flabellaris.
XXV.		—— flabellaris.
XXVI.		Diastopora obelia.
XXVII.		Discoporella fimbriata.
XXVIII.	1, 4.	—— algoensis.
	2, 3.	—— verrucaria.
XXIX.	1, 2.	Diastopora patina.
	3, 4.	—— simplex.
XXX.	1.	—— patina.
	2.	Discoporella novæ-zelandiæ.
	3.	—— hispida.
	4.	—— holdsworthii.
	5.	—— californica.
	6.	—— ciliata.
XXXI.	1, 2.	Domopora truncata.
	3.	—— annulata.
	4.	Cellepora, sp. parasitic on D. annulata.
	5.	Diastopora congesta.
	6.	Tennysonia stellata.
XXXII.	1.	Alecto granulata.
	2.	—— dilatans.
	3.	Tubulipora fungia.
	4.	—— ventricosa.
XXXIII.	1.	Fasciculipora digitata.
	2.	—— ramosa.
	3.	Defranceia lucernaria.
	4.	Discoporella ciliata.
XXXIV.	1.	Radiopora cristata.
	2.	—— simplex.
	3.	Discoporella radiata.
	4.	—— mediterranea.
	5.	Diastopora sarniensis.

Fig 2
Fig 1
Fig 3.
Fig 4
Fig 5
Fig 6
Fig 7
Fig 8

Fig 1
Fig 2
Fig 3
Fig 4
Fig 5
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Fig 3
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Fig 1
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Fig 5
Fig 11
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Fig 10
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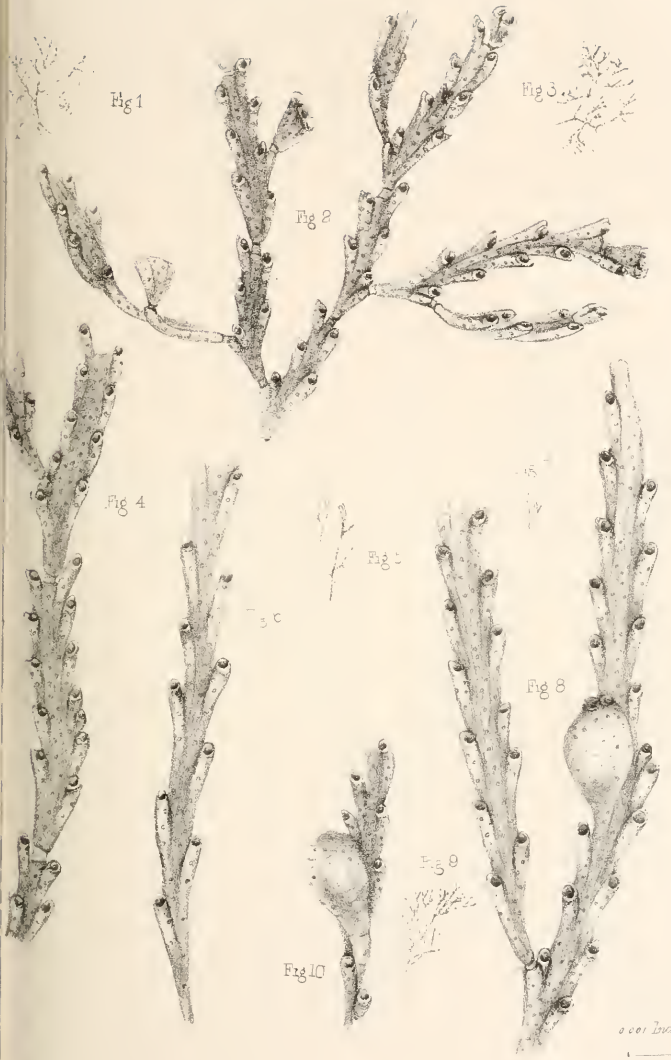
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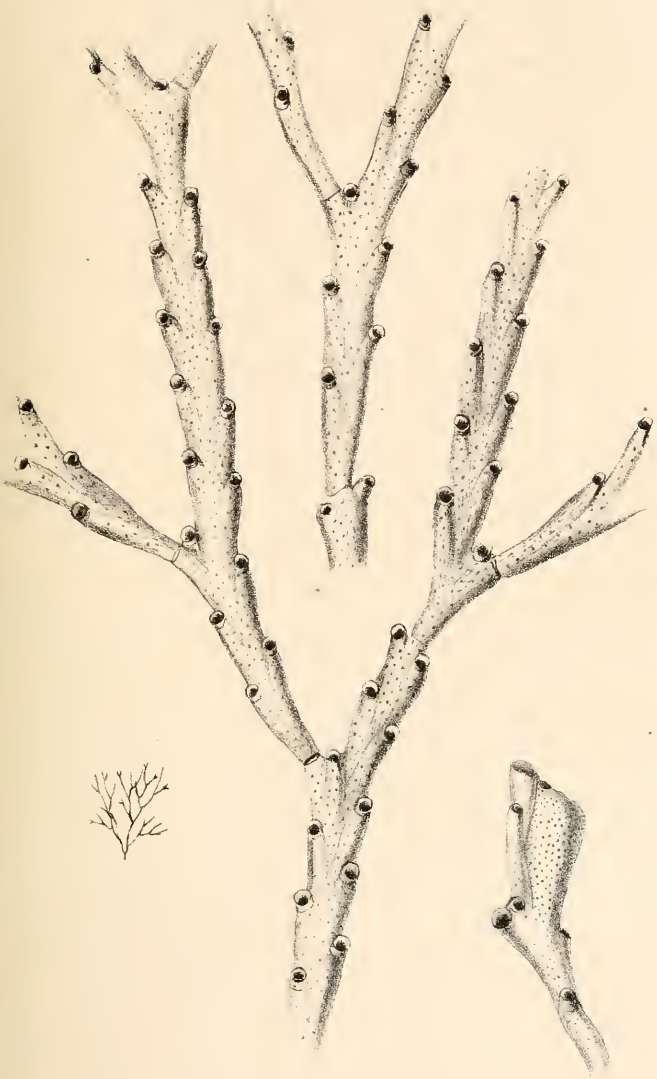

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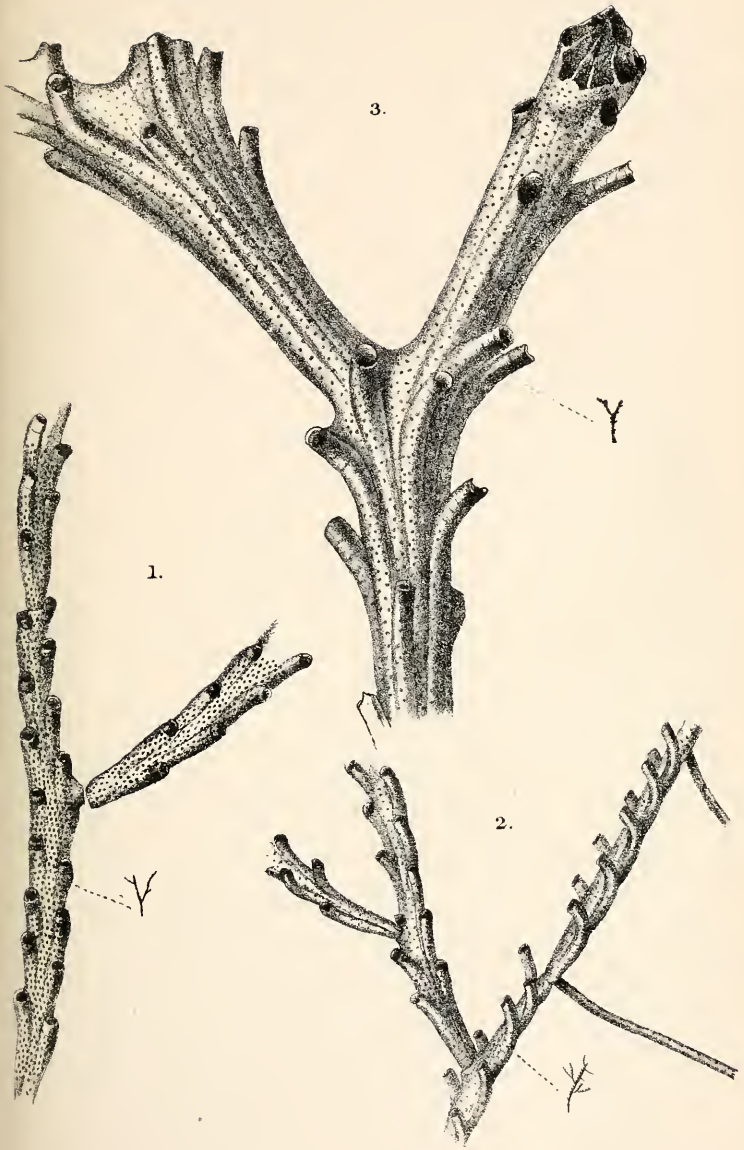

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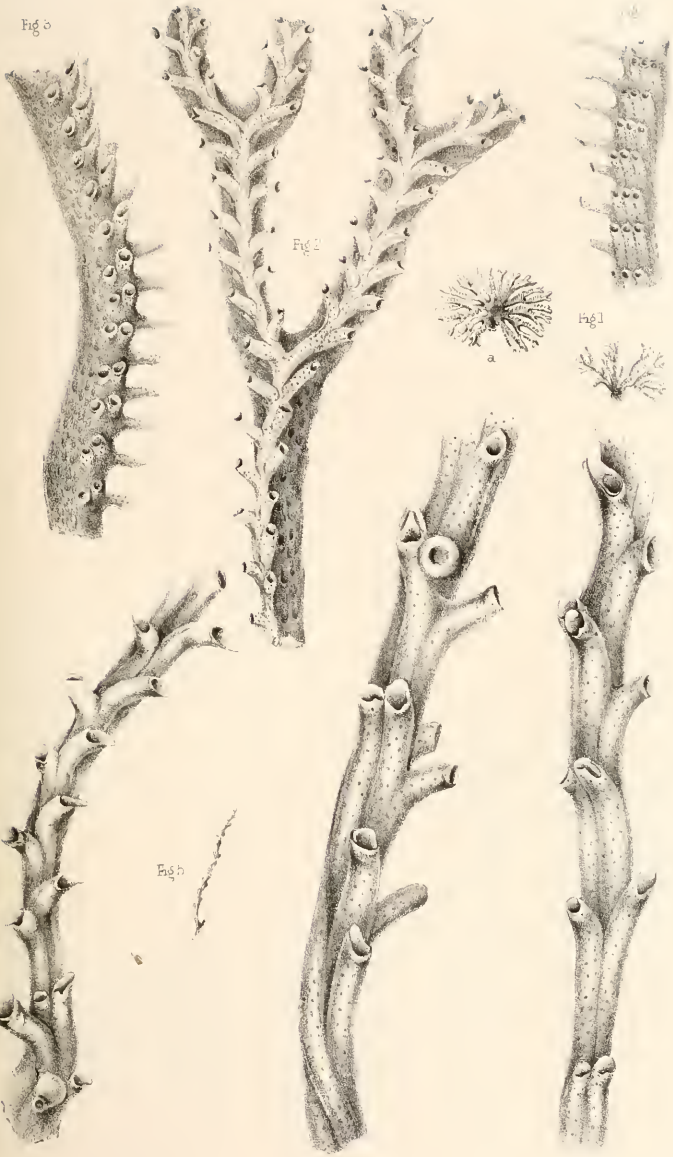

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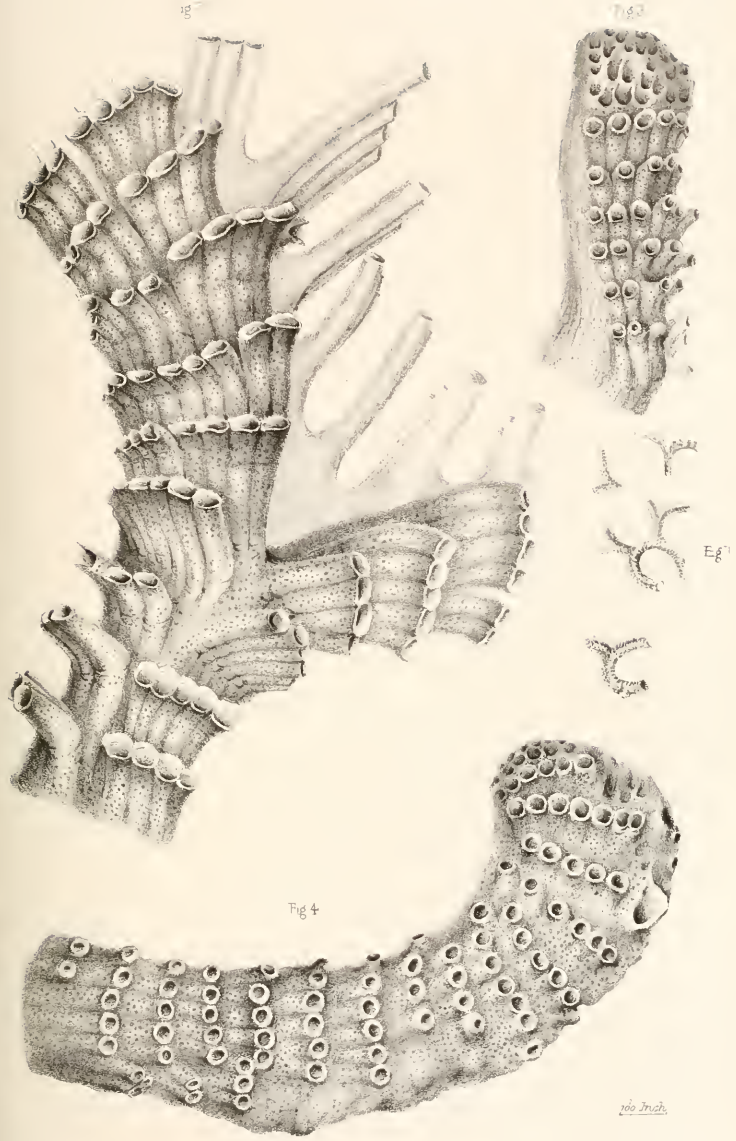
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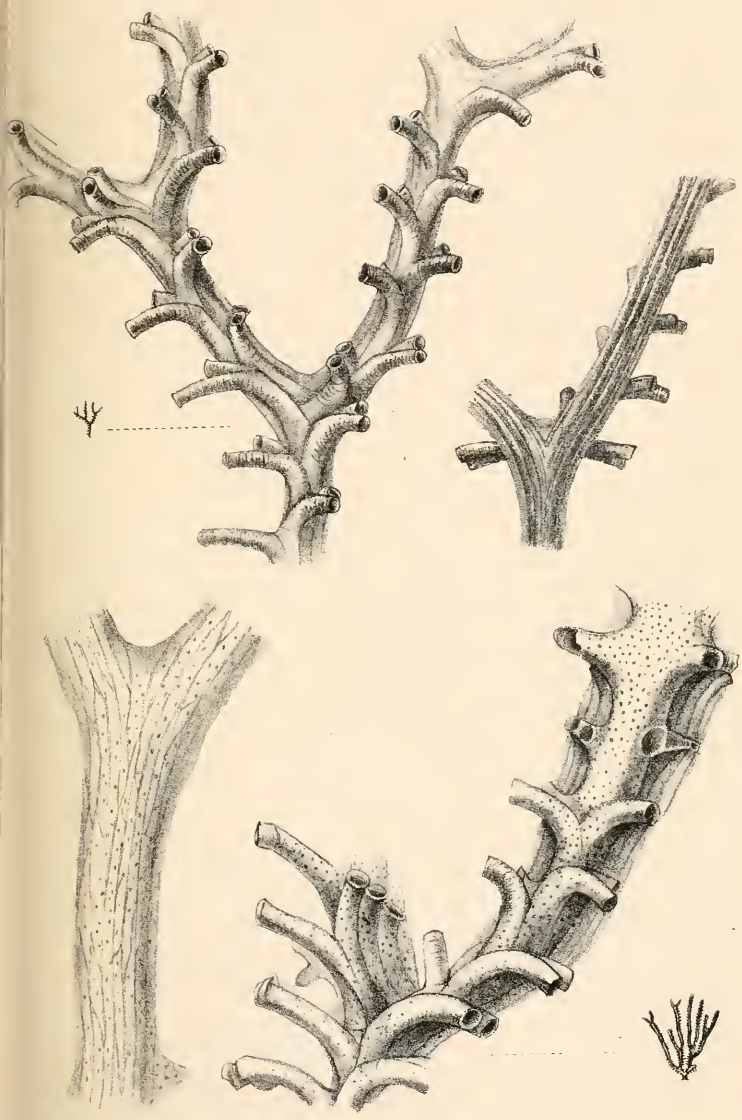

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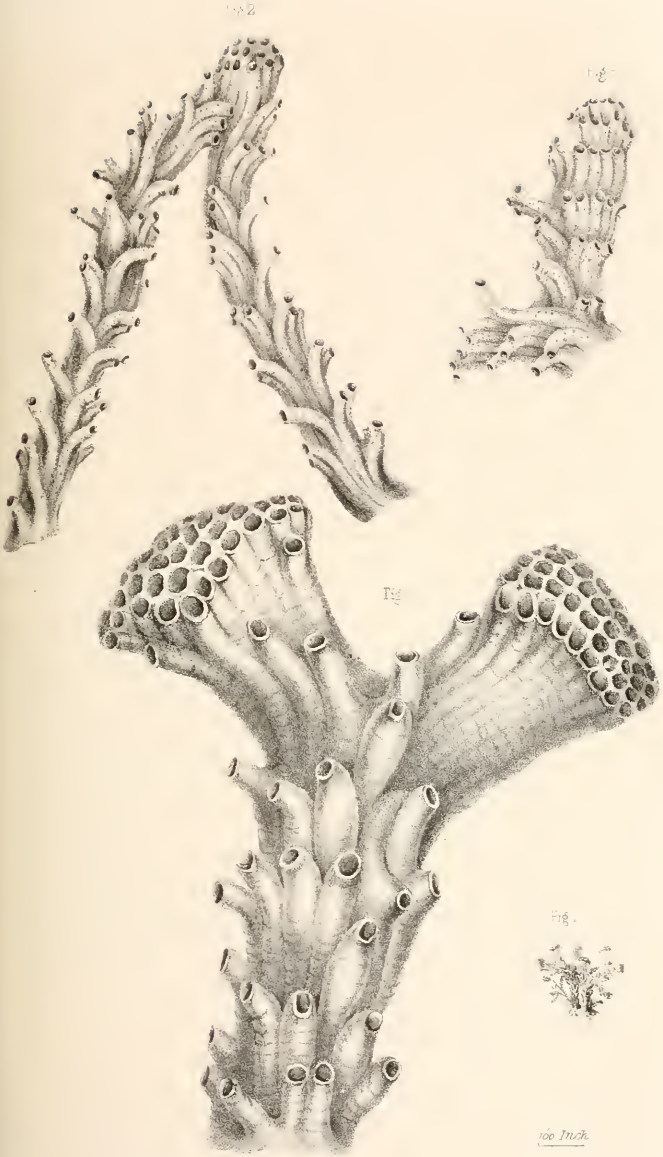
Fig 2.
Fig 3.
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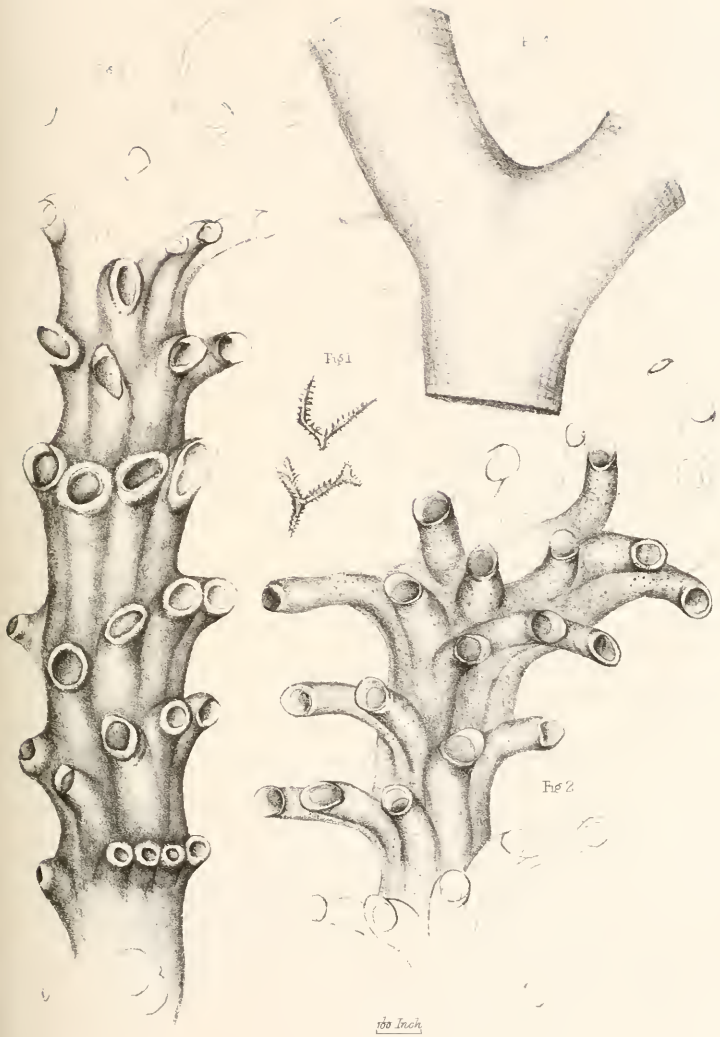
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Fig 2
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Fig 1

Fig 2

Fig 3

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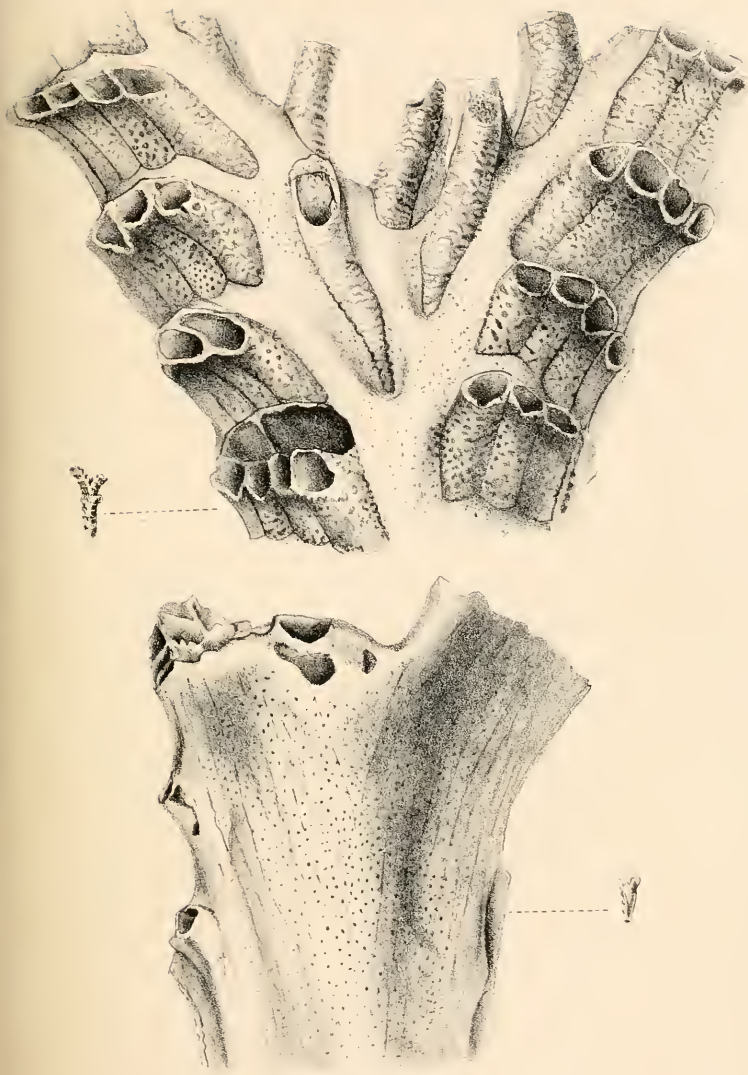


Fig 1.

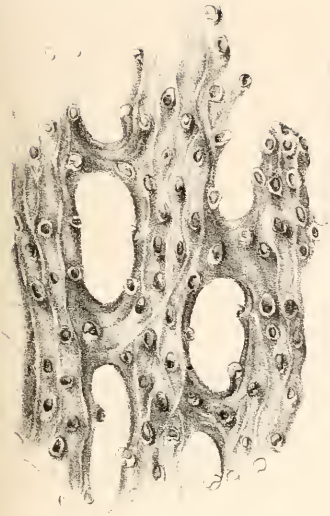


Fig 2

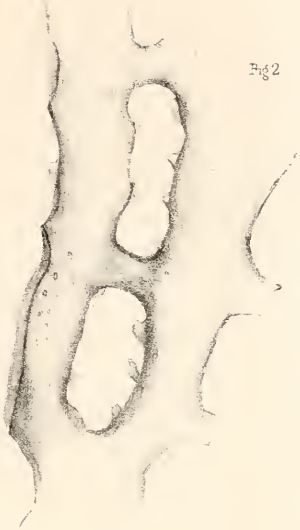


Fig 4.

Fig 3

Fig 5.

G.B. ad nat. del. et lith

W. West imp

G B sowerby del. et lith. Brettish

W West imp

Fig 2

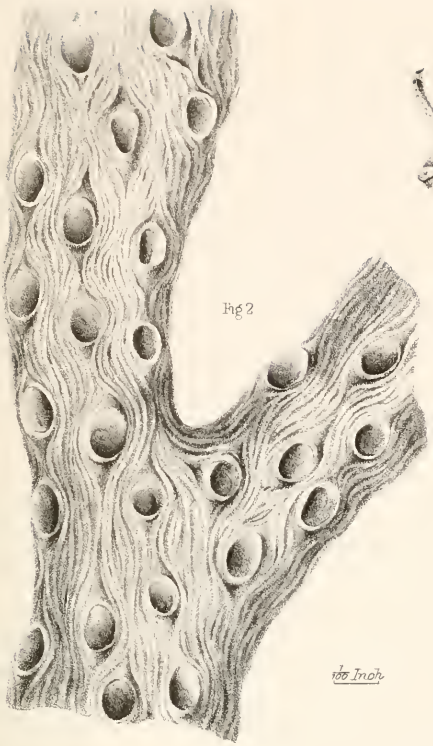
Fig 3.

Fig 1

1/00 Inch

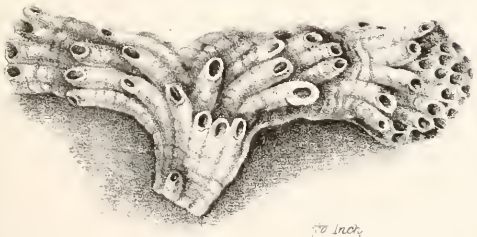
Fig 1

Fig 2



1/60 Inch

Fig 3



1/10 Inch

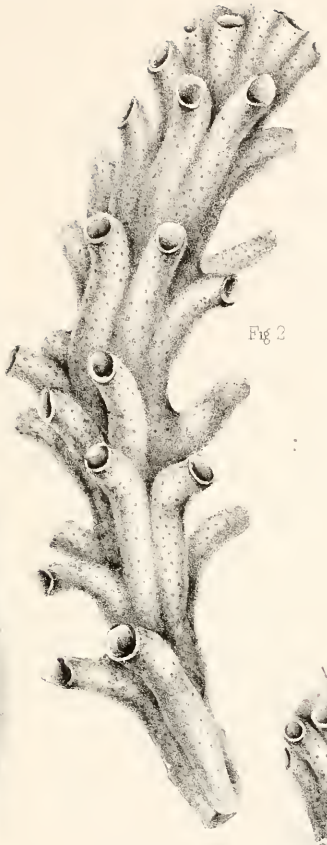


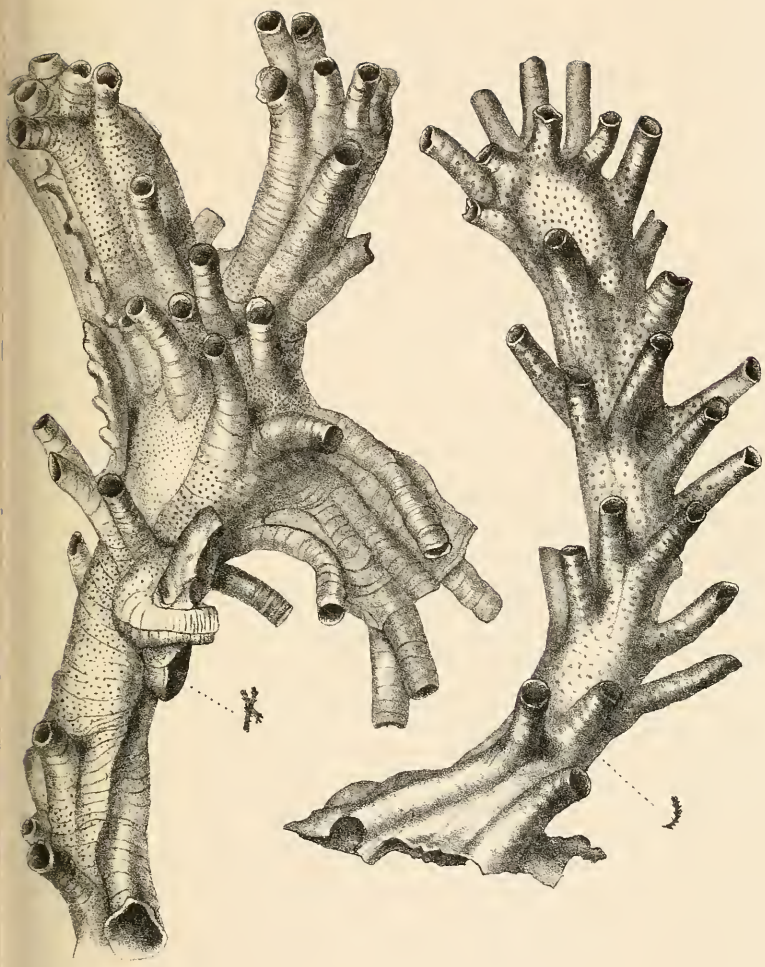
Fig 2

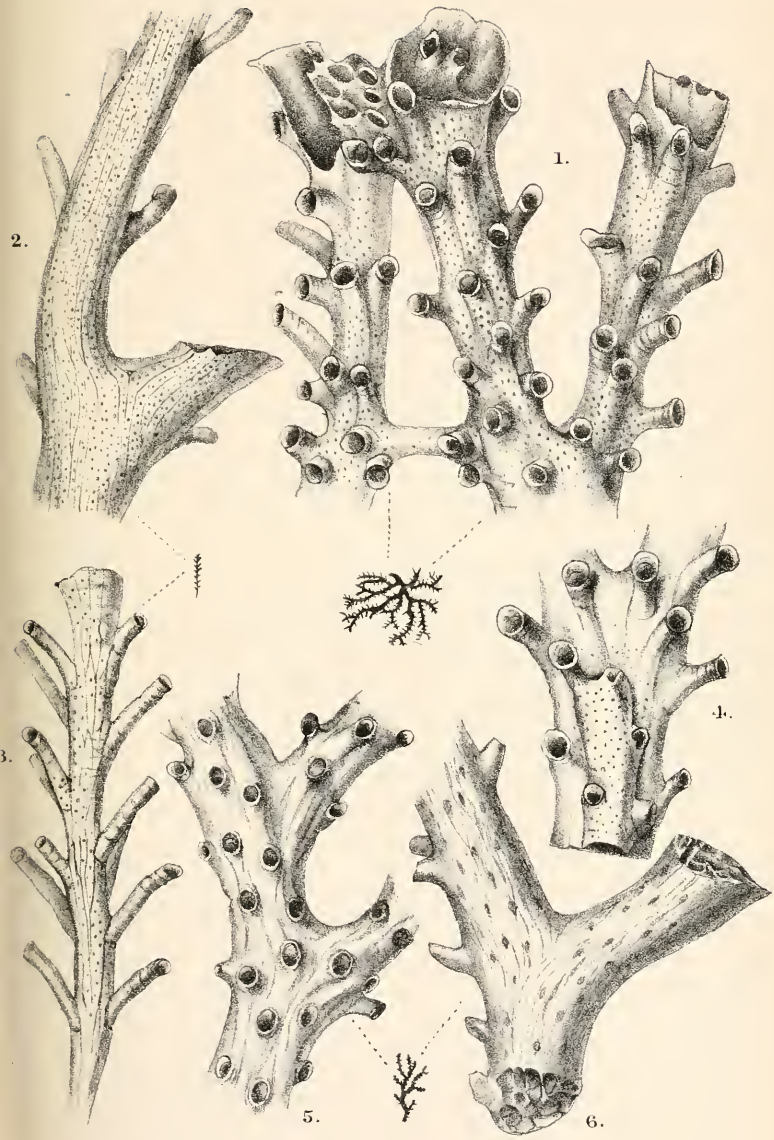
Fig 1

Fig 4

Fig.5

Fig 3.





G.B. del A Hollick lith.

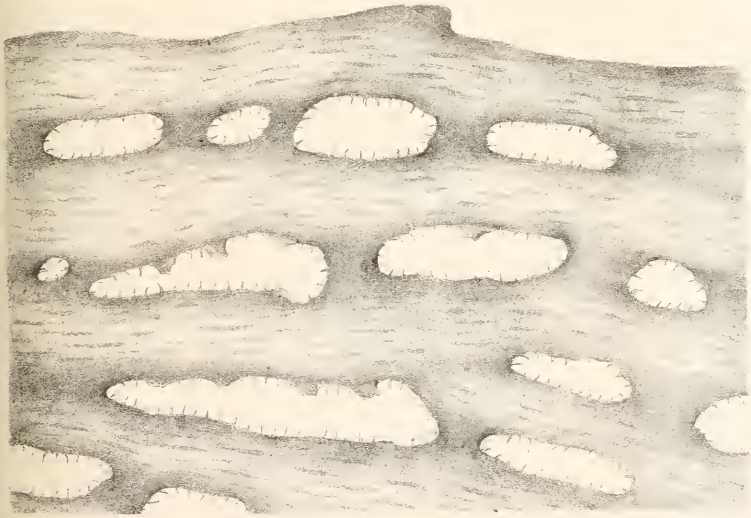
Mintern Bros. imp.

Fig. 2.

Fig. 1

Fig. 4

Fig. 3



1/10 Inch.

G.B. ad nat. del. H.L. Brett lith.

W. West Imp.

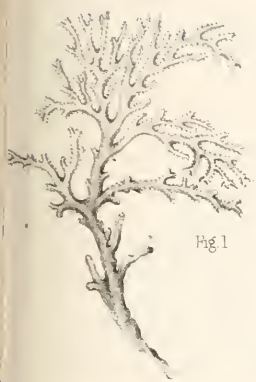


Fig. 1

Fig. 2

Fig. 3

Fig. 6

Fig. 5.

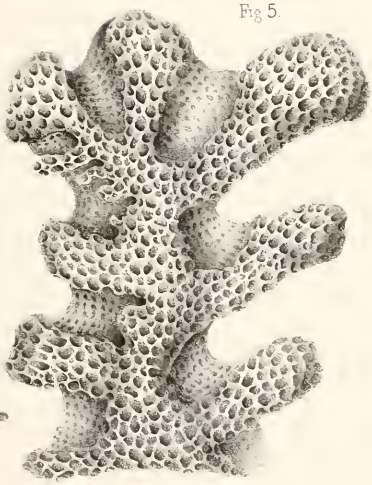


Fig. 4

$\frac{1}{100}$ Inch.

G.B. ad nat. del. H.L. Pratt lith.

W. West Imp.

Fig 1

Fig 2

Fig 4.

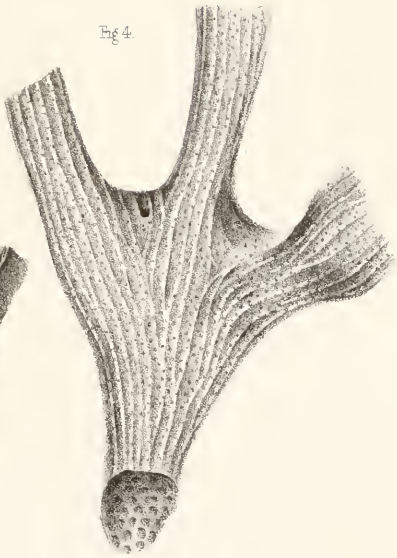
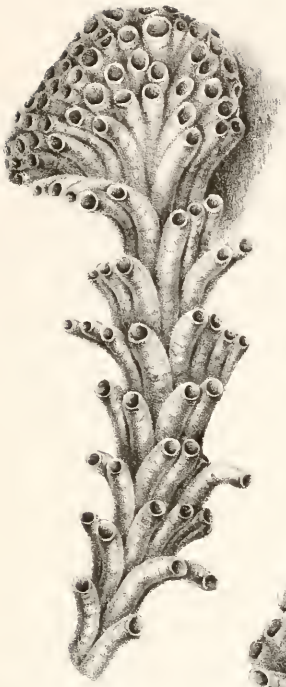


Fig 3

1/50 Inch

Fig 1



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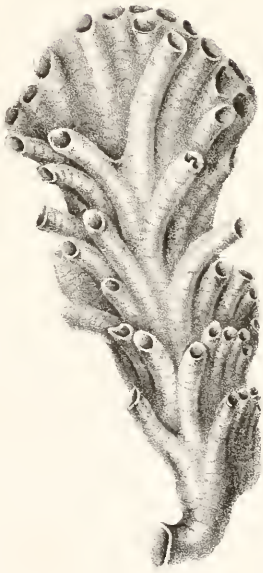


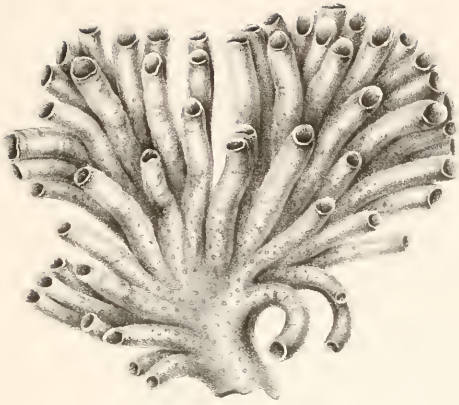
Fig 3

1/10 Inch

J. Braidwood. del. H.L. Brett. lith.

W. West. imp

Fig 1.



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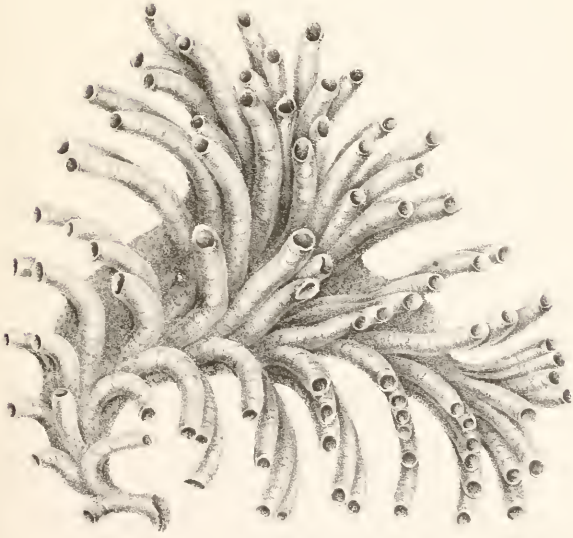


Paul nat del. H L Brett lith. W West imp

G.B. ad nat. del. H.L. Brett lith
W. West Imp

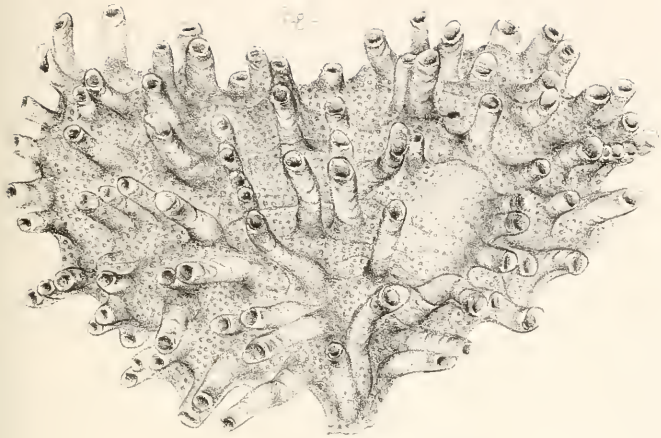


Fig. 1

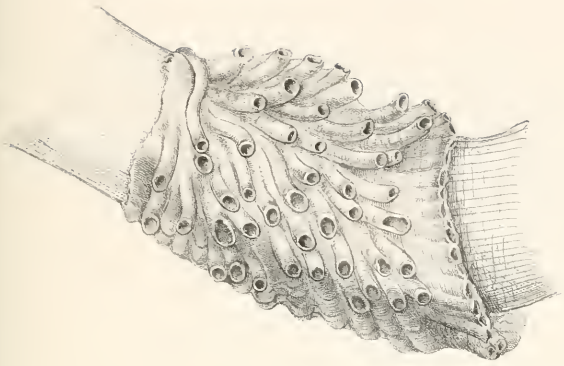


Fig. 2.

B.ad nat del. Tuffen West lith.

West Imp.

Fig. 1

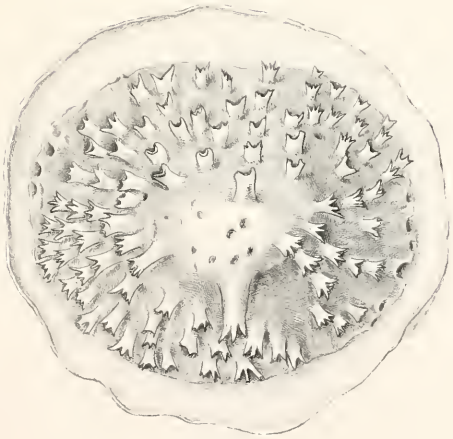
$\frac{1}{100}$ Inch.

Fig. 4.

Fig. 3.

$\frac{1}{100}$ Inch.

Fig. 2.

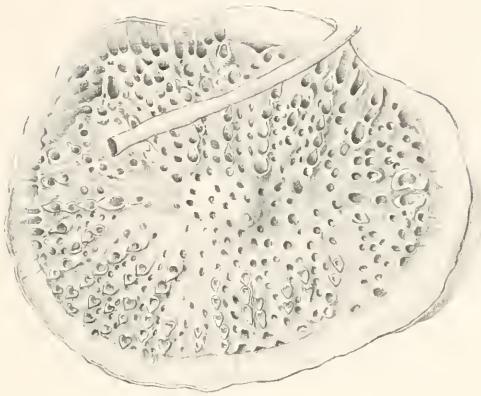


$\frac{1}{100}$ Inch.

G.B. ad. nat. del. Tuffen W[illegible] lith.

W. [illegible] Lond.

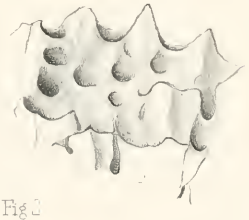
Fig 1



1/100 Inch

Fig 4

Fig 3



1/100 Inch.

Fig 2

1/100 Inch

Fig.1.

Fig.2

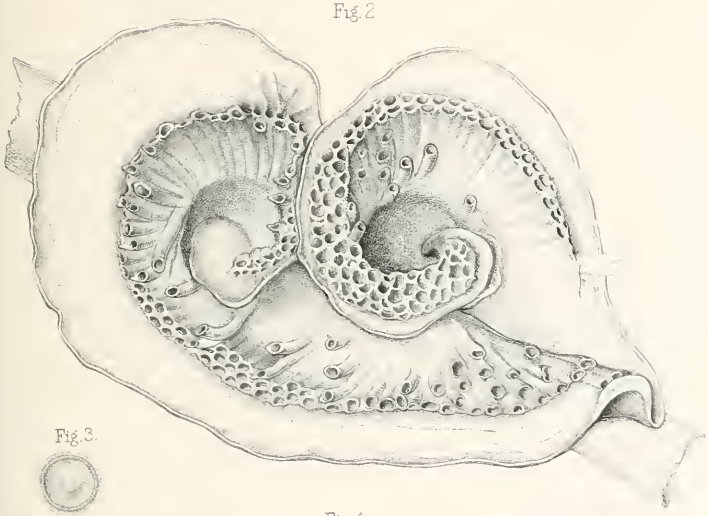
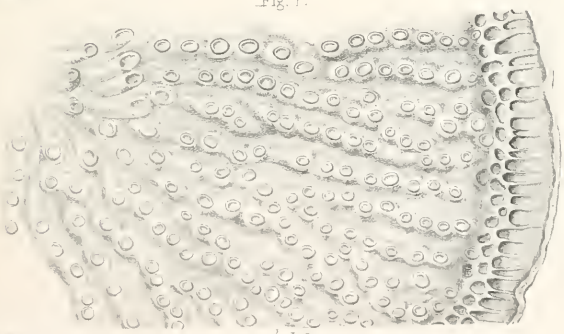


Fig.3.

Fig.4.



G.B.ad nat.del. T.Allom. West lith. 1/20 Inch. W.West Imp.

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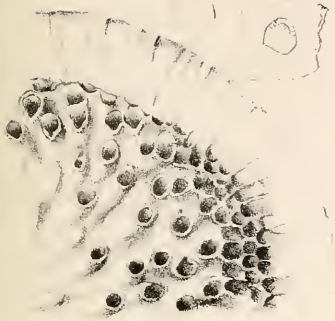

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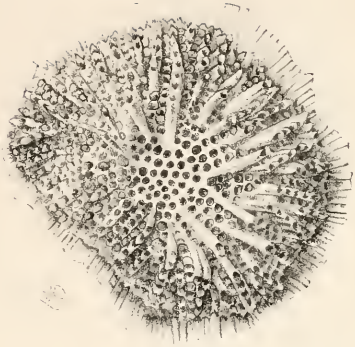

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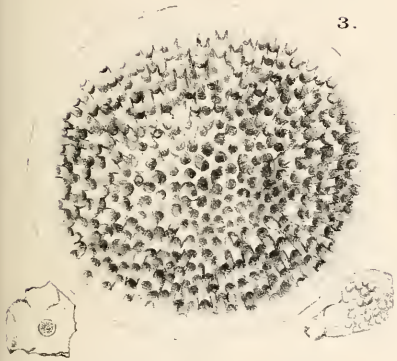

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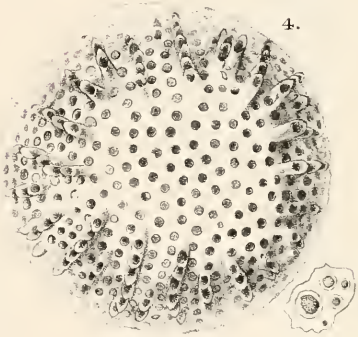

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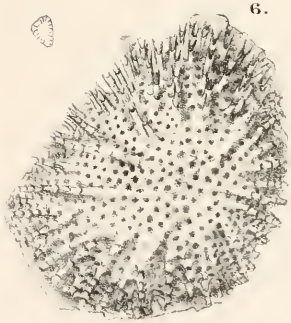
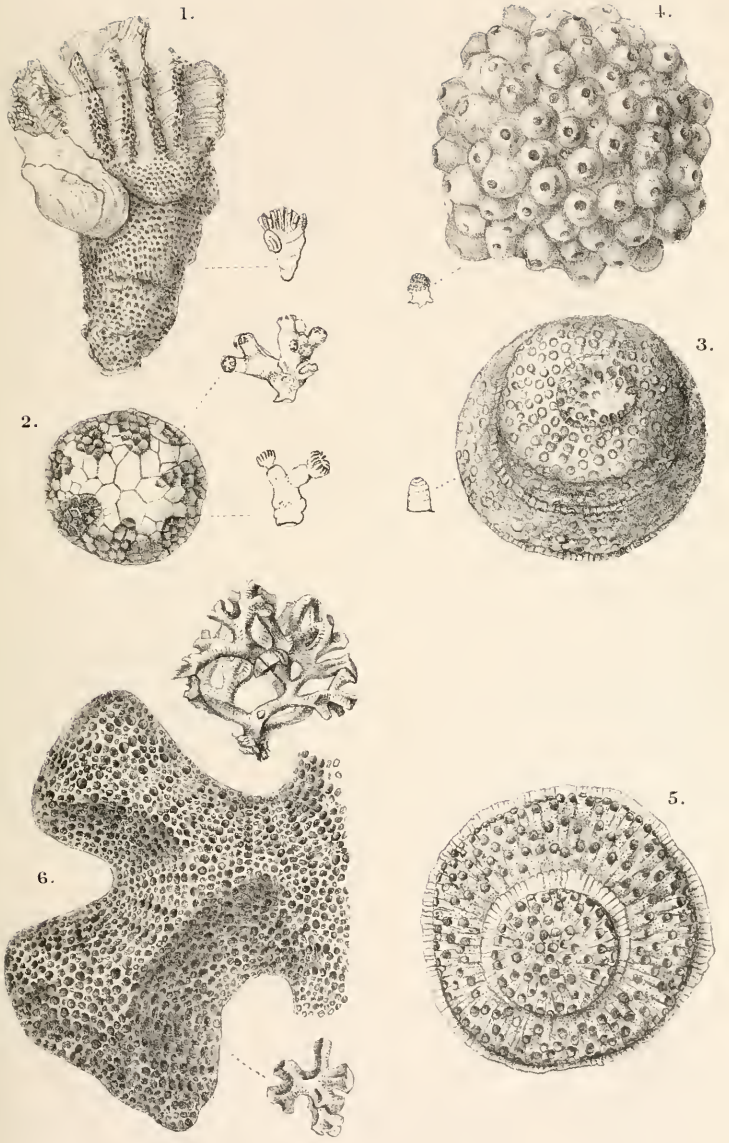
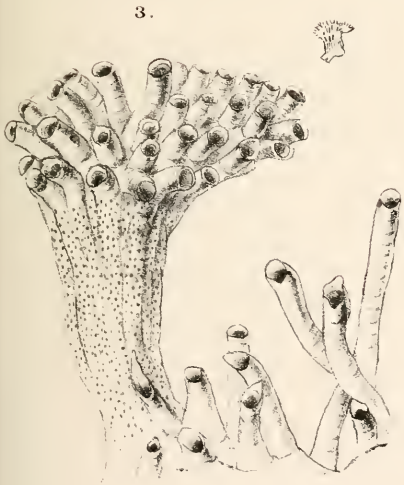




G.B. del. A. Hollick lith.

Mintern Bros. imp.



G.B. del. A. Holhek lith. Mintern Bros. imp.

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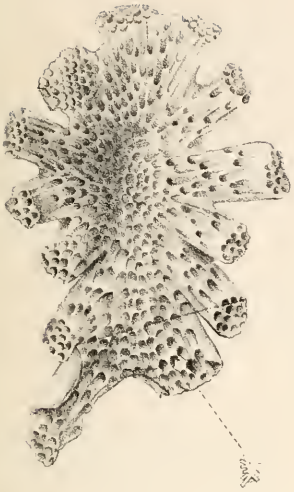

2.

4.

3.

G B.del A Hollick lith.

Mintern Bros imp

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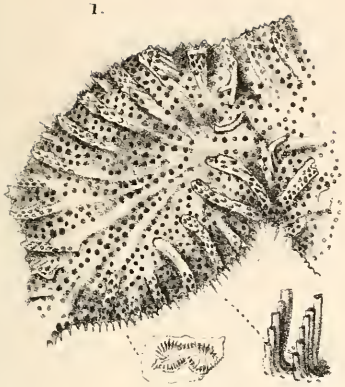

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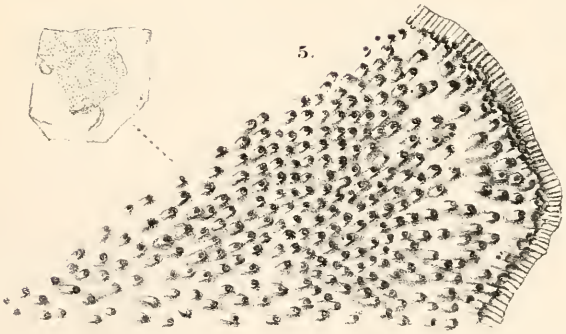
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